Medical Lib.

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MAY, 1930

Patients Delighted
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"The injection method of obliterating varicose veins and varicose ulcers has come to stay. It is a safe treatment which all medical men can carry out in their consultation rooms with the best possible results. . . . It is economical for the patient, both in time and money. **It is far safer than an operation, the patients are delighted and the medical men are satisfied. At the 1928 London Conference of The Royal Society of Medicine, Prof. Sicard and his assistants reported more than 300,000 injections given without a single fatality or even a severe complication." The Lancet, May 4, 1929, p. 957. The British Medical Journal states it is "a simple, safe and quick procedure."**

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Urology for the General Practitioner

VII. Cystitis in Its Clinical Aspect

VICTOR COX PEDERSEN, A.M., M.D., F.A.C.S.
New York, N. Y

Cystitis includes all varieties of vesical inflammation which differ widely in pathogenesis, lesions, progress, prognosis, sequelae and treatment. Cystitis is not always pyogenic, because pus is absent in cases which might be called aseptic or nonpurulent cystitis. On the other hand, pus may be a secondary symptom in an inflammation having necrobiotic lesions primarily.

The causes of cystitis are various, because the bladder is an active emunctory. The causes proceed from the urogenital tract itself, from the body at large, and finally from incidental sources, such as instrumentation.

A. Cystitis due to urogenital causes. This class embraces descending infections, ascending infections, intravesical and perivesical conditions.

I. Infection descending from the kidney or the ureter, either or both, and unilateral or bilateral, is not uncommon. The transit is commonly by the urine, the lymphatics or the contiguity of tissue. Circulatory metastases may carry infection, as when the kidney or kidneys and the bladder are infected concurrently. Unless the correct source of infection is diagnosed and treated, all treatment of the bladder itself is of little value. In nature, the cystitis follows that of the primary inflammation and may therefore be suppurative, phlegmonous, or membranous. Cystitis also corresponds in degree with the causative lesion, being therefore mild, severe, or intense.

2. Infection ascending from the urethra with or without infection from the urethra itself causes many inflammations of the bladder. As examples of infection from the urethra without urethral inflammation, one might name retention of urine or retention with incontinence, as in infectious diseases, extreme depression during systematic disease, alcoholism and diseases of the central nervous system. Stone, tumor and prostatic lesions of the bladder often cause urethral infection. Certain cases are due to instrumentation. The normal urethra frequently contains pus organisms, which, although they do not seriously affect the urethra itself, may cause a violent cystitis, and do when the bladder is a point of lessened resistance.

Suppurative inflammation of the vas deferens not due to a urethritis may infect the urethra and, in turn, the bladder. In these instances the nongonococcal suppurations in the lower urinary tract are assuming more and more importance in the minds of urologists. The frequency with which the bacillus coli in intestinal disorders filters through the bowel into the bloodstream and passes through the kidneys is a well recognized fact. At first it does little or no damage, but sooner or later suppuration occurs in almost any urinary organ. Thus the bladder very often becomes the site of its colonization.

As examples of cystitis from urethral disease, one might name gonorrhea and its multitudinous complications in both the male and female, stricture of the urethra from any cause such as traumatism, gonorrheal or other infections, and new growths. Obstruction of the outflow of urine by the stricture causes distention, hypertrophy, and frequently atrophy and atony of the bladder, any and all of which invite infection.

In women, any of the suppurative forms of infection of the vulva, vagina or uterus may, by direct ascent through the urethra, invade the bladder. A common ex-

ample is cystitis with the organisms of postpartum infection.

3. Cystitis due to conditions within or immediately without the bladder.—Chronic hypertrophy of the prostate is the most potent and obstinate cause; first mechanically, by obstructing the outflow of the urine by elevating the floor of the bladder into a retroprostatic pouch which sets up residual urine, and second sympathetically, by congestion of the bladder concurrent with the congestion of the protate. Decomposition of the urine marks the advent of active cystitis. Acute recurring congestion and abscess of the prostate in the same manner cause cystitis. Neoplasms of the prostate frequently, and of the rectum and uterus less frequently, may by an analogous action induce cystitis.

Calculus of the bladder soon causes and is itself often the product of cystitis. Through mechanical trauma a point of less resistance is established, namely, a septic reaction which becomes a fertile soil of infection ascending from the urethra, descending from the kidneys or ureters, or metastatic through the blood as the case may be.

Foreign bodies in the bladder are exceedingly active as sources of cystitis. Hairpins in women's bladders, introduced accidentally during masturbation, and other articles are often reported.

The common animal parasites are not to be forgotten. When ammoniacal decomposition of the urine occurs, deposits upon the offending substance within the bladder rapidly form.

Neoplasms of the bladder, benign and malignant, almost always cause cystitis, mechanically by their presence as foreign bodies, sympathetically by the changes in the circulation of the blood which they induce, and trophically by their influence upon the local health of the organ. The same may be said of the various ulcerations of the bladder, particularly tuberculosis.

B. Cystitis referable to the body at large (excluding the urogenital tract). This class embraces cystitis due to exposure, acute infectious disease, constitutional disease or diathesis, general sepsis, irritating foods and drugs.

1: Cystitis due to exposure to cold and wet. This form of cystitis is uncommon excepting in advanced life, especially in victims of prostatic disease. It is usually transitory, not severe in degree, nonpurulent unless pus is already present. Practically, this form of cystitis amounts to a severe congestion.

2: Cystitis secondary to or complicating acute infectious diseases. The most familiar forms of this cystitis are those of enteric fever, scarlatina, diphtheria, measles, smallpox, rheumatism, influenza, cholera, mumps, spinal meningitis and typhus fever. These instances are due to the presence within the bladder of the specific germs of the disease or to their toxins circulating in the blood which profoundly alter the constituents of the urine and may, by their presence therein, act as powerful excitants. Furthermore, and most least, is the general bodily depression always present in these severe sicknesses.

Hematology has not yet advanced sufficiently to show the nature and the quantity of such toxins in the blood. Yet their existence is almost indubitable as by-products of the growth and action of the organisms which cause all those diseases.

3: Cystitis due to constitutional disease or diathesis. The best examples of this are gout and diabetes. Gout without uric acid gravel is infrequent and certainly obscures the cause of cystitis. Gout usually produces gravel, which is the source of vesical disease. Why diabetes should cause cystitis is also obscure, unless it does so through lowered body resistance and chemical changes in the urine due to the sugar.

4: Cystitis due to or complicating organic nervous diseases. The nervous diseases giving rise to cystitis are: paraplegia, myelitis, syringomyelia, tabes dorsalis, sclerosis and paresis. What occurs in these diseases is either a paralysis of the bladder with retention or trophic changes within the bladder or both, concurrently or serially. Whatever the condition or changes may be, the soil is fertile for infection ascending, descending or metastatic.

5: Cystitis due to general sepsis. This might properly be called cystitis due to metastatic deposits through the bloodstream or the lymph-channels. The various forms of septicaemia are the sources of the infection, especially septicaemia with metastatic abscesses, formerly called pyemia. Under this heading might also be classed cystitis seen is many postpartum infections.

A similar form of cystitis might occur through direct extention from paravesical suppuration, as in the male and female genitals, the bones, appendix, etc.

6: Cystitis due to irritating food stuffs, beverages, and drugs. Among the drugs cantharides, turpentine, the balsams, bichloride of mercury, phosphorus and alcohol are the commonest. Any of these drugs must be taken in large or excessive doses as a rule to produce cystitis, which may be nonsuppurative, suppurative, and even diphtheritic. Some foods, especially if fermented, may excite cystitis; thus ptomaine poisoning might be classed under this heading.

The newer formaldehyde compounds classed under urinary antiseptics are potent for both good and bad in the urinary system. If the formaldehyde element is not liberated at all such preparations are inert. If it is liberated too freely then great irritation and even microscopic or macroscopic hemorrhage from the kidneys occurs with a similar inflammatory reaction in the bladder. If it is set free in an orderly degree then the formaldehyde becomes a means of great antiseptic action especially against the colon bacillus group.

C. Cystitis due to extraneous causes.

1. Cystitis due to injury. This results usually from local depression of the bladder due to the injury and followed by infection. Examples of injury are falls and blows upon the pelvis and the lower portion of the abdomen, fractures of the pelvic bones, pressure from pessaries, the displaced womb, the fetus in childbirth and impaction of the rectum. Unduly severe instrumentation of the bladder may also injure it and promote cystitis. Examples of the sources of infection would be puerperal fever, endometritis and prostatitis.

2. Cystitis due to instrumentation. The insertion of unclean catheters and sounds, stone searchers and cystoscopes is the commonest source of this form of suppurative cystitis. If these instruments, although themselves sterile, are passed through a urethra which is still infected with gonorrhea, for example, a suppurative cystitis will result. If the instruments are sterilized in irritating fluids and immediately inserted, aseptic cystitis may result. Such fluids are carbolic acid and bichloride of mercury.

3. Cystitis due to irritating irrigations. Any aseptic and antiseptic fluids may be injected into the bladder either of too high degree of temperture or strength and cause a thermal or chemical, suppurative or membranous cystitis of mild, severe or intense type. The facts explain why the irritation treatment of subacute and chronic cystitis, as stated later, must be correct as to quality, quantity, strength, temperature and gentleness of inlet and outlet. A declining cystitis may be increased by any mistake in detail.

Pathology of Cystitis.

The common varities are nonsuppurative cystitis, pericystitis and paracystitis. Although sooner or later cystitis displays germs it seems unsound pathology to say that all cystitis is septic. One is not yet positive as to the bacteria which cause cystitis and as to the precise manner of their advent into the bladder. Just as there may be aseptic infections of various organs, for example, due to thermal or chemical irritation, various toxins in the circulation and trophic nervous diseases, so in the bladder these factors may produce superficial or deep necrobiotic changes without the presence of real bacterial infection. Cystitis during chronic congestion from enlargement of the prostate, displacement of the womb and cirrhosis of the liver, for example, may be regarded as a nonbacterial inflamation, the so-called aseptic cystitis. Naturally it takes little infection to convert this form into septic cystitis.

The simple or aseptic cystitis is rather common, varing between congestive and hemorrhagic inflammation. It is self-limited unless the cause persists, then septic cystitis soon supervenes. A more or less severe hyperemia occurs with little or no pus unless through increased intensity or prolongation of the primary causes infection occurs.

Three subdivisions of the common pathogenesis may be made. 1. Irritating substances in the urine through ingestion, irrigation or circulation. 2. Irritation by changes in micturition. 3. Vasomotor irritation through vascular or nervous influence.

The most important ingesta which may excite aseptic cystitis during their elimination in the urine are the balsams, bichloride of mercury, cantharides and turpentine. Recovery follows, unless, by increase or continuation of the poisoning, septic inflammation follows. Irrigations and instillations have similar effects when too hot, too cold or too strong, likewise the toxins of constitutional and infectious diseases. No one has yet settled whether or not in the case of the infectious diseases the bladder symptoms are due to urinary changes or to the systemic influence of the disease acting upon the bladder locally.

Of the constitutional diseases, those which commonly have hyperaemia of the bladder associated with them are diabetes mellitus, phosphaturia, gout, idiopathic cystinuria, idiopathic oxaluria and scorbutus. Whatever changes the reaction of the urine into ammoniacal urine is a powerful source of cystitis, as is also the ammoniacal urine itself after the change has occurred.

Whatever contributes to changes in the urinary function will produce aseptic hyperemia of the bladder, for example, superdistention, voluntary or through disease, frequency and overexertion in emptying the bladder and chronic retention of urine. If these conditions are organic it is inevitable that septic inflammation follow.

Vascular and nervous changes in the circulation induce the third group of causes of aseptic inflammation. Obstruction of the ascending vena cava from any source necessarily causes intense congestion of the bladder. A large number of the diseases of the spinal cord set up the same result temporarily or progressingly or permanently. The presence of stone and parasites in the bladder also produces this form of inflammation.

Septic or suppurative cystites may have important associated lesions such as poor general health, antecedent infectious disease, or several atacks of nonsuppurative cystitis or of dysfunction of the bladder. Trophic changes due to organic spinal or cerebral disease by lowering the nutrition and resistance of the mucosa, and alteration of the urine from acidity to alkalinity are important.

The organisms underlying suppuration in the bladder are numerous, but the most important are grouped: 1. The pyogenic group—staptylococcus and streptococcus: 2. The bacterium coli commune group, containing about sixteen varieties; 3. saprophytic group, notably the micrococcus ureae; 4. Putrifying group, usually bacillus proteus vulgaris; 5. Gonococcus, usually associated with others; 6. Bacillus tuberculosis, producing its own type of suppurative break-down. 7. The organisms of acute systemic disease such as typhoid fever and pneumonia may cause suppurative cystitis.

The lesions are of two types: those of the bladder as an organ and those of the urine.

The changes in the bladder depend on the attack mild, severe or intense, acute subacute or chronic, involving the bladder alone or its adnexa also. There occur hyperemia, hemorrhage into or upon the mucosa, desquamation of epithelium in cells, plaques or areas, general or bullous edema, hypertrophic or polypoid infiltrations, septic degeneration, false membranes, ulceration superficial or deep or going over into gangrene, calcareous incrustations or free gravel or stones.

The whole bladder wall may be involved, setting up pancystitis, also called pericystitis. The infection may extend to the aduexa, cause a cellulitis, and then become a paracystitis.

The urine may be faintly or strongly acid or alkaline or neutral depending on the nature of the process and its stage. True polyuria is uncommon. Albumin, always present, may be due to the pus, or to it and a nephritis. Casts are usually present and aid in this diagnostic point. Blood cells or free blood occur. Sugar is rare. Microscopically the common findings are pus-cells, red blood-cells, epithelia, fragments of necrosed tissue and crystals determined by the reaction of the urine. Very important are the bacteria whose classes have been already given. Hence the specimens had best reach the pathologist while still warm. In a few hours the mixed growth may mask the real culture.

The symptoms in the bladder itself are pain over the pubes or in the perineum, dysuria, pollakiuria, tenesmus, nocturia, strangury. The prostate, if also congested or inflamed, gives its charactistic syndrome. If the disease is pericystitis or paracystitis all these symptoms are augmented and those of pelvic cellulitis supervene.

The systemic symptoms are those of the cystitis added to those of the underlying disease. Fever in cystitis alone is rare. If present all other causes should be searched for. Gastrointestinal and nervous symptoms occur in severe cases as in all other severe illnesses. If they persist and simulate the uremic syndrome, then renal lesions must be searched for. Their variety is too great to include in a paper on bladder inflammation. Hence statement of the fact of their occurrence suffices.

The diagnosis may be confused with suppurative posterior urethritis because each has pain, pollakiuria, tenesmus and, at times, strangury. But the three-glass or four-glass test, when applicable, at least indicates the difference. Cystitis has little or no urethral discharge, but considerable pain in the suprapubic and rectal fields. The last glass of urine in evacuating the bladder floor is always turbid and often more turbid than any other glass. The characteristic urinary elements, already stated, are destructive. Instrumental penetrative treatment and irrigation are almost impossible because of the pain, supersensitiveness and reflex resistance. In chronic cases this severe picture disappears and only altered urine remains. Cyptoscopy declares the origin of the pus as vesical and not renal, and shows the depth and extent of mucosal lesions.

The prognosis of simple cystitis is good although the

patient must care for his "weak-spot," which the bladder may be for years. Suppurative cystitis has a prognosis dependent on such of its forms as pericystitis, paracystitis, menebranous cystitis, and on such sequels as ascending ureteritis and pyonephritis, and of course on the type and virulence of the organisms and the primary systemic disease from which the vesical inoculation occured.

The treatment varies with the acute, subacute and chronic stages. In the severe stages the urine is increased, diluted and neutralized. The standard drugs are to be preferred over the synthetic patent or semipatent group: Salol, boric acid, benzoate of soda, bicarbonate of soda, citrate of potash, citrate of lithium, urotropine. Pain, tenesmus and strangury call for opiates, belladonna and their allies. Pelvic decongestion and counterirritation are provided by rest in bed, regular action of the bowels, bland digestible diet, and plenty of fluids up to but not beyond excessive excretion of urine. Physical measures such as radiant light applied for hours over the suprapubic, lumbar and perineal regions in turn will give better results than hot general or sitting baths, although these still have high value.

In the subacute stage the quality of treatment remains unchanged but the quantity is decreased and irrigation of the bladder begun. This cleansing of the bladder must be absolute in showing the return fluid as clear as it enters, except, perhaps, a few strings or shreds. Even they in a short time should disappear in favorable cases.

The irrigating fluid should be a solvent of mucus, pus and detritus so as to remove adherent masses. After the return is perfectly clear a mild antiseptic may be sparingly and cautiously used. If such is run in prematurely it is apt to coagulate the mucus, pus and detritus and thus increase its adherence to the wall of the badder. Such a result is always inconvenient and often harmful to the patient. In all irrigations of the bladder slowness and gentleness are the rule. The patient should have no reaction at the time or directly thereafter, such as increase in any symptom.

Chronic cystitis is a law unto itself. All the measures noted are continued. The patient must persevere in them all. The cystoscope alone watches the progress and checks up lesions, prognosis and treatment.

Chronic cystites almost always have the bacillus coli at work. Hence, one of the cardinal things to accomplish is such change in the flora of the intestine that its overgrowth will be prevented, and thus its presence in the urine, and attack upon the bladder stopped. Every patient must be studied individually, but the various types of milk sugar in the bowel are an unfavorable medium for the bacillus coli and of service; the several forms of lactic acid cultures and preparations, the formaldehyde type of urinary anteseptics (provided the kidneys break off that radicle), and free drinking of buttermilk or bulgaricus milk also helps.

I have recently had a case of many years' duration which developed urine clear and free of the bacillus coli after taking two or three glasses of buttermilk or bulgaricus milk daily for about four months. In this man the milk was well digested and did not, as it sometimes does, increase the bacillus coli in the bowel and the urine. If the kidneys split off the formaldehyde radicle it may be detected chemically after a few days. In some patients it irritates the kidneys, increasing casts, red bloodcells and epithelia. This reaction must be followed and respected by modifying the doses.

Many cases of cystitis, especially paracystitis and pericystitis, are so severe that perineal cystotomy and drainage alone for a week or two are efficient in putting the bladder at rest and in permitting other measures of treatment to make progress against the disease.

Tuberculous and cancerous cystites are such definite entities in themselves that they must be omitted from this paper of general facts as to vesical infections.

Constitutional treatment obviously is so various that one cannot in a paper of this extent detail it. In short the antecedent disease must be cured in its immediate and remote sequels. Preventive measures against ascent of the infection from the bladder to the kidneys are highly essential. All means to build up the general health and strength are in order: full, well ordered diet, regulation of bowels, exercise, baths, tonic medicines, change of climate and life. No one plan can be fixed for all. Many patients cannot do much that is advisable, through lack of means and other opportunity. These patients have the longer and often uncured lesions. It must be remembered that if a mucosa anywhere in the body is damaged beyond certain limits it does not recover. Hence, all prognosis for full restoration of function in severe cases must be guarded. The most familiar example of this fact is the poor bladder function following prostatectomy, not because the surgery has failed but because the bladder was too much damaged before the removal was assented to.

It is hoped that this brief review of cystitis will help the general practitioner in recognizing and treating these troublesome cases.

45 W. Ninth St.

The Lump in the Breast

In our course the accused is innocent until proved guilty, but in the breast a lump is cancer until proved benign. The surgeon who advises watchful waiting in the presence of a single definite breast lump in a woman over twenty-five will find too often that he has been watching an early cancer become incurable. Every such lump should be explored. In the examination of a breast (without skin retraction or other classical signs of cancer) decision should be limited to the question of whether an actual lump is present or whether the mass felt by the patient is only a "lumpy" area of breast tissue—a decision that, in itself, often requires no mean skill and experience. And the surgeon should never lose sight of the fact that extended or vigorous examination may cause rapid metastasis of an early cancer. One or two gentle touches must furnish all the information needed. Leaving a breast sore from clinical examination is absolutely inexcusable.

It is today settled and no longer debatable that exploration of a breast lump is justifiable, but it is equally undebatable that if cancer is found, the complete operation must be done at the same time. Frozen section diagnosis should always be available. Occasionally only a microscopic section will settle the diagnosis. But the average hurried frozen section is less trustworthy than paraffin or, colloidin sections, and the competent surgeon will depend upon a reasonably clear gross diagnosis rather than on frozen section if the two disagree. The really competent breast surgeon must be at least a good amateur pathologist. It is not too much to ask that he be confident of his recognition of certain typical pictures—of normal breast tissue, of cancer, of the encapsulated lump, of the simple and the papillomatous cyst, and of the nonencapsulated cystadenoma.

But our responsibility is not ended when we have learned to deal properly with breast lumps. We cannot treat early cancers unless our patients bring them early. It has been proved possible to educate communities about breast lumps. There is still room for improvement in popular knowledge in California. Physicians must educate their patients to bring breast lumps for examination the moment of discovery. As a matter of fact, we can well go farther than that. Over 90% of breast cancers are discovered accidentally—unintentional contact of the hand on the breast in bathing or dressing. The accidentally discovered lump has often been present and discoverable for months before it is found. Lumps should be sought for by every woman routinely, not discovered accidentally. If we teach our patients to keep track of themselves as a matter of habit, passing a soaped hand flat over the breasts at frequent intervals, we will see many more curable cancers. And the sensible woman, taught that a lump is the one important danger sign, will not develop a morbid phobia so long as she continues to find her breasts free of lumps.—Kilgore, *Calif. & W. Med.*

Ouabaine

Ouabaine intravenously is an important cardiac stimulant. It is not so effective by mouth.

Concerning Endocardial Murmurs

EDWARD E. CORNWALL, M.D., F.A.C.P.
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The mechanistic meaning of endocardial murmurs was more considered formerly than at the present time. We now think of all disorders of the heart primarily in their relation to the efficiency of that organ as a pump; which efficiency depends on the ability of the muscle of the heart to contract properly. The functional efficiency of the heart has come to outweigh in medical estimation its anatomical deformities. But the endocardial murmurs which are produced by cardiac deformities are positive diagnostic data, and are entitled to consideration as such. The deformities which produce these murmurs put a burden on the heart; they constitute a factor which must be taken into account in estimating the functional efficiency of the heart. The anatomical-pathological diagnosis, while less important from the therapeutic view-point than the physiological-pathological diagnosis, is of equal scientific dignity and standing with the latter.

It is interesting to compare, as cardiac diagnostic data, endocardial murmurs and cardiac arrhythmias. The murmurs are reflections of abnormalities in the shape of the cardiac blood channel. They may indicate a permanent anatomical deformity of the cardiac channel or a temporary deformity of the channel due to failure of coordinated action on the part of the various structures of the heart. The arrhythmias are disturbances of the heart beat, of the time and force relations of the regular cardiac activities. They may indicate definite pathological changes in the myorcardium, or disorders which are apparently functional. The conditions responsible for both these classes of physical signs interfere with the efficiency of the circulatory apparatus by the interposition of obstacles or impediments. They are to be differentiated, as factors making against an efficient circulation, from the factors presented by pathological conditions causing simple weakness of the heart muscle, and from the factors due to vasomotor disturbances.

The heart is a tube through which the blood flows at a considerable rate of speed. Physical principles can be applied to the explanation of the production of endocardial murmurs by obstacles to the blood flow at different points in the cardiac channel, both in hearts structurally damaged and in those functionally disordered; and they can also be applied to the explanation of the transmission of these murmurs to the regions of the body surface where they are heard by the listening ear. The anatomical diagnosis of the cardiac conditions which produce endocardial murmurs has been elaborately studied. and the details can be found in the textbooks. I will not here go into those details, but will discuss briefly a few topics connected with endocardial murmurs which are of a general character.

When an endocardial murmur is detected, the question arises, does the murmur indicate a permanent change in the cardiac channel due to an organic lesion, or does it indicate a transient or functional deformity?

Of significance in this connection is the place of the murmur in the cardiac ventricular cycle. It is possible to make the broad statement, that diastolic murmurs are regularly due to organic deformities of cardiac valves, while systolic murmurs are not so regularly due to organic deformities, but are often due to functional disorders of the heart. Aortic diastolic murmurs and mid-diastolic and presystolic mitral murmurs point to permanent organic valvular deformities, with rare exceptions. Such an exception appears in the case of the Flint murmur, which seems to be due to a relative mitral stenosis caused by the ventricular dilatation of aortic incompetence: in this case the mitral orifice may be normal, but the dilatation of the ventricle makes the condition one of relative stenosis.

The fact that systolic murmurs do not always point to an organic valvular lesion, but are often due to functional disorder of the heart or to disease of the myocardium or aorta without valvular deformity, gives them a particular interest. Systolic murmurs produced at the aortic or pulmonary orifices may be due to organic stenosis of those orifices, or to relative stenoses dependent on enlargements of the blood tube immediately beyond the orifice, or enlargement of the ventricle behind the orifice. Systolic murmurs produced at the mitral and tricuspid orifices may be due to structural deformity of the valves there located which make them incompetent, or to undue relaxation of the auriculo-ventricular ring from disease or dysfunction, which prevents proper coaptation of the valve flaps, or to weakness or dysfunction of the papillary muscles which cause the valve flaps attached to them to give way under the systolic strain, with production of a functional leak: the functional murmur in this last case is developed after the intraventicular pressure has reached a considerable degree, and consequently is not synchronized with the beginning of the first heart sound, but appears after the muscular element of the first sound has made itself audible; it is a late systolic murmur.

In the diagnostic evaluation of endocardial murmurs the other cardiac diagnostic date must be taken into account. This context is particularly important in the case of systolic murmurs, which are not so definitely pathognomonic as diastolic murmurs. A systolic murmur which is not associated with other signs and symptoms of heart disease can usually be considered as functional and lacking in serious cardiopathic significance. This point is of particular importance in connection with the patient's psychology. It has been remarked that no one is quite the same after he has become possessed of the idea that he has organic heart disease. Endocardial murmurs, as signs of heart disease, are particularly impressive, especially to minds not medically trained. It means much for the comfort of a patient who has a systolic murmur which is functional, to have the diagnosis correctly made, and to be properly reassured.

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Poisoning By Aspirin

At the Sussex Assizes on July 9th, a woman, aged 25, charged with poisoning her infant by means of aspirin, was found guilty but insane, and the judge directed that she be kept in custody as a criminal lunatic until His Majesty's pleasure be known. It appeared in evidence that the accused had dissolved 300 tablets of aspirin, each of 5 grains, in a pint of water, and, having given two dessertspoonfuls to the infant, had taken the rest herself; the infant died the following day. Dr. E. J. Budd-Budd stated that for a child two dessertspoonfuls of a solution containing 1,500 grains of aspirin to the pint would be a fatal dose. The defence was that the accused was insane at the time she committed the act. —*Brit. M. J.* 2: 128, 1929.

Undulant Fever

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Bacteria of the genus *Brucella* cause infection in goats, sheep, pigs, and cattle and the general name Brucelliasis is given to all of these infections. Each of the animals mentioned has a strain of its own and human beings may be infected by direct contact in the care and slaughtering of animals, and there is evidence to show that some human beings are infected by drinking the milk of infected animals.

Undulant fever as it appears in this country may be due to *Br. melitensis, Br. abortus* of porcine origin and *Br. abortus* of bovine origin. *Br. abortus* seems so closely associated with *Br. melitensis,* the microorganism which causes Malta fever, that they may be considered as different types of the same microorganism. True Malta fever may be found in this country, due to infection by *Br. melitensis* from drinking goats' milk.

Br. abortus may be porcine or bovine in origin. The porcine type causes abortion in sows and may cause undulant fever in man. The bovine type causes abortion in cows and may also cause undulant fever in man.

Cows may be infected with the porcine strain, and in this way human beings may be infected. At the moment it is not possible to state which strain is the cause of undulant fever in this country. There is a tendency for milk producers and veterinarians to attribute the disease to the porcine strain, but the medical profession seems to agree that drinking raw cow's milk is one of the causes of the disease. The source of the infection apparently differs in different areas.

While it is probable that drinking infected milk can cause the disease, it is encouraging to note that there are only a few cases of undulant fever, considering the widespread infection in cattle throughout the country. (In some parts of the country as many as 90% of the herds are estimated to be affected with *Br. abortus* infection). It would seem, then, that it is only when milk becomes infected with a strain of *Br. abortus* of unusual virtulence that it can cause undulant fever and ordinarily the usual types found in milk cause little trouble. It is probable that when the milk contains unusually large numbers of microorganisms, as, for example, after abortion, susceptible persons are apt to contract the disease. Therefore, at the moment the disease is not a serious menace to health and there is no reason for excitement, yet every precaution should be taken to prevent the spread of this infection.

It is extremely difficult to prove that cow's milk is the actual cause of the infection. In one of my patients, a woman, aged 39, it was found that she had been drinking raw milk from a herd which was badly infected by *Br. abortus,* yet no other member of the family was affected. Moreover, a careful check-up of consumers along the entire route supplied by this producer failed to reveal any more cases of undulant fever.

It is possible that we may have infections of *Br. abortus* in human beings so slight as to be undiagnosed. There may be cases so mild that they do not come to the attention of physicians.

SYMPTOMATOLOGY

My patient complained of headaches and lassitude for several months. On November 11th, she suddenly had a fever of 102° F., and complained of chills and headache in the left temporal region. The fever continued at 103° F. for five days, then dropped to 100° F. for one day, only to climb to 104° F. Each afternoon at 3 or 4 o'clock she had a definite chill. White cell count was 5800 with a normal differential count. Her blood showed the positive agglutination of *Dr. abortus* in dilution of 1:1280. After four weeks' illness she improved and was free from fever. The illness caused practically no loss of weight and with the exception of weakness she seems to be as well as usual after the attack.

Blood examinations made for *Br. abortus* from drop smears, as for the Widal reaction, are not to be depended upon. It was only when 5 c. c. of serum were taken that the diagnosis was cleared.

The disease is characterized by its long undulatory course, sweats, increasing anemia, debility and arthritic symptoms. Some patients have a slight bronchitis. The incubation period is from 10 to 14 days. It is difficult to say how long the fever will last as cases have been reported of one to two years' duration, or even longer. The usual duration is three months. Insomnia is usually present. The hip, ankle, shoulder or knee may show arthritic symptoms. Subcutaneous abscesses may be present.

The disease rarely proves fatal except in the malignant type. It causes great economic loss to the patient. In some instances the disease consists of only a single attack while in others it is only after several years of suffering that the infection abates.

The diagnosis is made by the agglutination test and the dilution must be at least 1:80 with a time limit of 30 minutes. The test may be employed for making a retrospective diagnosis.

TREATMENT

There is no specific treatment for the disease. The patient receives much the same general care as the typhoid patient. Intravenous injections of mercurochrome have been used. Others have given acriflavin intravenously. Vaccines seem to be of benefit in some mild cases, at times, but in general have been unsatisfactory. Autogenous vaccines may be used.

PROPHYLAXIS

Br. abortus infection is widespread in cattle and in swine and there is a great deal to be done to eliminate the disease in these animals. Thus far, practically nothing has been done to attack the parasitic diseases in swine. Some states have attempted to assist farmers in eliminating the disease in cattle and several states will not allow cows to enter their borders for breeding purposes unless they are blood-tested. "Certified milk" now comes from herds which have been tested for *Bacillus abortus* and all positive or doubtful reactors are known and segregated.

Many individual milk producers have attacked the problem by having tests made at regular intervals. Farmers should realize the great loss through abortion and sterility that this infection causes. In building up a herd all cows should be tested. It will require a few years to eliminate the disease in herds. It can be done but it is costly as quarantine of reactors is necessary. If only a few reactors are present in a herd it is probably wiser to sell the animals for immediate slaughter and have the premises thoroughly disinfected. It will require several tests at various intervals accurately to determine the diagnosis.

Sanitary management of handling an infected herd is a necessity. Every farmer should read *Farmers' Bulletin* No. 1536, U. S. Dept. of Agriculture, "Infectious Abortion of Cattle." As much attention should be given to the elimination of parasitic disease in swine.

Dr. Theobold Smith, in an address before the Annual State Health Conference at Saratoga Springs, June 25, 1929, said:

"The problem confronting the health officers is the particular source of the bacilli found in human patients. The solution of this problem is made difficult on account of the great similarity of the bacilli from the different animal sources. While slight differences may be brought out by bacteriological technic and animal inoculation they are neither sharp nor constant. In this country the problem is practically narrowed down to two sources, cattle and swine. In view of the prevalence of infectious bovine abortion in this country for some thirty or forty years, with a peak probably ten years ago, the question arises why not more cases, and even local epidemics? The tentative explanation resulting from studies of human strains of the bacilli is that the genuine bovine type is relatively harmless to man and that the swine type is largely responsible, either directly in the handling of swine or raw pork or indirectly when the swine bacillus is introduced into the cow's udder in one of several ways.

"Geographical varieties of the bovine type may, however, exist which favor human infection. In Denmark the human strains appear to be identical with the true bovine type.

"The bacillus is destroyed in the process of pasteurization. In view of this fact it may be that the gradual extension of this process during the past decade has deprived man of a certain vaccinal protection given by the bovine against the swine type of bacillus. Et. Burnet has shown that the bovine bacilli when injected into human volunteers have little or no disturbing effect. They, however, give rise to protective antibodies. This possible explanation of the increase in undulant fever does not justify any relaxation in the movement for more pasteurization but it does indicate the need for more investigation into the swine disease and other non-bovine types of *Brucella abortus*."

Most medical authorities, the United States Public Health Service and the Department of Agriculture at Washington recommended pasteurization of milk as a protection against whatever danger there may be from *Br. abortus* in milk, until dairymen are able to eradicate the disease from their herds. It is safe to drink raw milk from herds which are properly tested after several intervals and all reactors placed in quarantine barns. Moreover, as the disease apparently does not attack children, Grade A milk would seem to be safe but most pediatricians prefer pasteurized milk for infants and children. Pasteurized milk must be clean and produced under strict sanitary precautions before pasteurization. It is necessary for health authorities carefully to check up on the pasteurization process at regular weekly intervals, or at least once a month, while the plant is in operation. Otherwise we may find that the label "Pasteurized" may give us a false sense of security.

There has been a feeling in certain localities that milk to be pasteurized could be filthy and that the process of pasteurization would make the milk safe. This is not true. Moreover, milk must be properly handled after pasteurization to prevent contamination.

If we are to use pasteurized milk, we must also use butter, cream and cheese from pasteurized milk.

Human beings may transmit the disease or contract it by caring for goats, sheep, pigs and cattle, or slaughtering them and dressing their carcasses. There should be careful disinfection of the hands of such workers. All cuts and scratches on the hands should be disinfected.

Summary

1. Human beings may be infected by *Br. abortus* by direct contact or by drinking the milk of infected animals.
2. Undulant fever may be due to *Br. melitensis*, or *Br. abortus* of porcine or bovine origin.
3. Cows may be infected with porcine strain and in this way cause this type of infection in human beings.
4. Source of infection apparently differs in different areas.
5. *Br. abortus* infection is widespread in cattle and swine.
6. Apparently when milk becomes infected with a strain of unusual virulence it can cause undulant fever in man.
7. Probable that when milk contains unusually large numbers of microorganisms susceptible persons are apt to contract the disease.
8. Disease not a serious menace at moment.
9. Undulant fever causes headaches, lassitude, fever of long undulatory course, joint symptoms, sweats, anemia and debility, and may simulate typhoid.
10. Diagnosis is made by positive agglutination test in a dilution at least 1:80.
11. Disease rarely proves fatal but causes great economic loss and suffering.
12. No specific treatment. It is hoped that a satisfactory vaccine will be developed.
13. It will be a slow process to eliminate contagious abortion from cattle and swine.
14. Thus far practically nothing has been done to eradicate parasitic disease from swine.
15. Every effort should be made to eliminate the disease by sanitary herd management.
16. All cows should be tested for *Br. abortus* infection at regular intervals.
17. Pasteurization of milk best protective measure against whatever danger there may be from *Br. abortus* infection.
18. Pasteurized milk must be clean and produced under strict sanitary precautions before pasteurization.
19. Health authorities should inspect pasteurizing plants at regular weekly intervals.
20. Cows are infected with two types of *Br. abortus*; one type is apparently harmless to man while the other is not.

Spontaneous Tuberculosis in Guinea-Pigs

According to H. A. Reisman and Adelaide B. Baylis, the use, universally adopted, of guinea-pigs for the inoculation diagnosis of tuberculosis may lead to diagnostic errors, as it is possible that a pre-existing tuberculous infection may be present in the animals. Sewal found spontaneous tuberculosis in a notable number of laboratory guinea-pigs which had never been intentionally inoculated with tuberculosis; and Cooper and Petroff have demonstrated the presence of tubercle bacilli in the lymph-nodes of 33 per cent of normal guinea-pigs. The present authors record a series of experiments which they made along these lines on guinea-pigs, the results of which lead to the conclusion that tuberculosis may be present in apparently normal guinea-pigs, and that these animals may have a pre-existing tuberculous focus similar to that induced by inoculation; an intracutaneous tuberculin test will, however, reveal the presence of a tuberculous lesion. The authors point out the importance of this contingency in relation to the various laboratory investigations for detecting tuberculosis in human beings, and they advise that guinea-pigs of uncertain history should be tested with tuberculin before being employed for such purposes.—*J. Lab. & Clin. Med.*, p. 205, Dec. 1929.

Suppurative Otitis Media and Mastoiditis—Instructive Cases*

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In the endeavor to make a report covering interesting cases, four cases of different types have been selected, because of the special points of interest connected with each, and the lesson to be learned in each case.

The first is that of a woman about 32 years of age, who reported for examination on May 30, 1918, with a history of chronic suppurative otitis media following an attack of scarlet fever in early childhood. There had been intermittent earaches which became more exaggerated in the last few years, the ear becoming blocked at times. The discharge had a very foul odor and was so profuse that it would run out of her ear and down on her clothes unless she kept it constantly plugged with cotton and made frequent changes. It was so objectionable in character that she was restricted from social functions and her own child objected to coming up to kiss her because of the odor. She also complained of buzzing in the right ear for the past fifteen years.

Examination of the nose, except for a small vomer ridge of the septum, was negative. The left ear showed a retracted tympanic membrane but was otherwise negative. On examination of the right ear the first thing to be seen was a large polyp extending almost to the meatus beyond which nothing was visible. There was a rather thin foul discharge. On removal of the polyp by avulsion with a snare, and removal of the base by cauterization with strong silver nitrate solution, the ear was became by June 5. It was found that the tympanic membrane had entirely disappeared together with the malleus and probably also the incus. The ear remained dry for several weeks and then the profuse discharge of intermittent character again appeared. Dizziness was also complained of. An autogenous vaccine, and some drops containing formaldehyde, boric acid and alcohol, were prescribed.

As the dizziness persisted, a Barany Test was made a month later, 11/23/18. It failed to show any abnormality in either labyrinth. The discharge being rather persistent a radical operation was offered but declined by the patient, who preferred to try palliative treatment a while longer, as the condition had certainly improved since the beginning of treatment and the ear had been dry about a month or more. She was rewarded for her patience, for the ear became dry three months later and remained so over a period of more than two years being observed at long intervals.

The chief lesson to be derived from this case is that a polyp, unless it be removed completely, precludes the drying of an ear. It also teaches us that in the presence of a polyp a cure may be obtained if it is removed, for while the polyp may be the result of some ossicular or bone necrosis, the necrosis in the bone may long since have subsided, and the presence of the polyp cause persistence of the discharge. With the removal and eradication of the base of the polyp, the inflammation has an opportunity to subside. It also calls attention to the fact that cases, even of scarlatinal origin, that have extended over a life time can sometimes be cured by palliative means if attention is paid to the minutest detail of the toilet of the middle ear.

The second case was that of a female, aged 44, with a history of acute tonsillitis, beginning March 4, 1929. She developed pain in the ears on March 6, there being a spontaneous discharge on the 7th, and finally both tympanic membranes were opened on the 8th before admission to the hospital.

The patient was admitted to the Northern Liberties Hospital and first seen by the writer on March 9, with a temperature of 101°, leucocytosis 8,000, polymorphonuclears 85%. She had a feeling of intense stuffiness in the nose with a rather profuse, watery, muco-purulent discharge, and intense bogginess of the turbinates. Both ears showed a thin sanguineous discharge. The patient had great pain in both ears with some tenderness over the tips of the mastoids. X-Ray of the mastoids the following day showed both to be apparently surgical, but since clinical evidence showed great improvement operation was deferred. The temperature declined within the next forty-eight hours to 98.8: with a decrease in tenderness over the right and no tenderness over the left mastoid. The condition then remained stationary for several days. The pain returned on the 15th, the temperature rose to 99.8°, and the patient complained of some headache in the morning. There was a profuse discharge and X-Ray on the 16th showed a progression of the condition, so that mastoid operation was decided upon for the following day. At the operation the cortex and the entire mastoid bone on the right were found to be dense white bone. The tip of the mastoid was removed without discovering any pus. The antrum was extremely small and hard to find. The dura was exposed and was apparently normal. No softened area of bone or collection of pus was found anywhere, but merely extreme sclerosis. Iodoform packing was introduced and the left mastoid attached. Almost identical conditions were found on the left side, with the exception of a few small cells along the bony canal wall and at the top. These contained a small amount of thin pus. Owing to the density of the bone, a considerable amount of rather hard chiseling was necessary and this probably accounts for the extreme headache which the patient suffered for three or four days following the operation. It is quite likely that she suffered from a mild concussion of the brain caused by the repeated mallet blows upon the chisel. Her recovery was otherwise uneventful, with the exception that a small sequestrum worked out of the posterior wound four months later, and the hearing in the left ear has remained somewhat impaired. In this type of sclerotic mastoid we always have to be on our guard because these patients suffer intense pain without much tenderness, as a rule, over the mastoid. They always threaten, and frequently do, invade the brain cavity much sooner than the ordinary cellular type of mastoid. Headache in this type of case should always call for rather prompt action. The case quoted would probably have been operated upon sooner had the type of the mastoid been suspected, but peculiarly enough, the X-Ray films did not reveal the extreme denseness of the

* Read before the North End and North Branch of the County Medical Society on November 27, 1929

bone. Burrowing pus meets far less resistance in the tegmen antri or tegmen tympani than it does in the dense bone.

The next case is illustrative of this very point. Peculiarly enough, it was seen within the same week that the former case was observed and very similar conditions were found in the mastoid.

Case three occurred in a female, aged 42, residing in Vineland, N. J. After a cold in the head lasting eight days, she developed pain in the right ear, 3/19/29, for which a paracentesis was performed. As there was no relief from the pain a second wide incision of the drum under chloroform was performed on 3/21/29. She subsequently complained of intense pain which required large doses of narcotics and allonal to give her rest. She was seen for the first time by the writer 3/24/29. X-Ray showed entire right side obliterated, none of the cell partitions being seen. The left mastoid showed intense cloudiness of entire mastoid region, except that in the upper and posterior border a few cells were visible. These pictures were taken and read by a technician. Personal reading did not confirm that there was any disease in the left mastoid, but that there was merely a diplöic condition of the bone. The right mastoid showed a questionable cloudiness. The temperature had been ranging between 99.8° and normal. The leucocyte count was about 8,000, with 70% polymorphonuclears. Examination of the left tympanic membrane showed some slight congestion of the malleus, but otherwise nothing abnormal. The right ear contained a moderate amount of a rather purulent discharge. There was a drooping of the posterior wall, continuous with the tympanic membrane. There was considerable tenderness over the tip of the mastoid but not much tenderness elsewhere. In view of continued intense pain, despite two paracenteses, the diplöic character of the mastoid bone, the tip tenderness and the appearance of the X-Ray, it was determined to operate at once.

The operation was performed at the Newcomb Hospital in Vineland, under nitrous-oxide anesthesia. When the cortex was exposed, it was found to be very dense and non-cellular, except in the region of the tip where a few small cells were found containing a thin doubtful pus. The lateral sinus was very superficial. The knee extended high up into the region of the antrum and was exposed for about one half inch, and was apparently normal. The antrum was deep. Iodoform strip packing was introduced and the upper and lower portions of the wound sutured. Following the operation the patient's temperature rose gradually, reaching 102.6° on the third day, and then gradually declined until it struck normal on the fifth day. The patient, however, continued to have persistent headaches . The other ear became inflamed and discharged two days after the operation, but only for a few days. When seen by the writer four days after operation, the wound was draining somewhat; there was some suggestion of a Koenig's reaction on the right side. No ankle clonus; no Babinski. The knee-jerks were not exaggerated. Spinal puncture revealed a cloudy fluid which was slightly contaminated with red blood cells but showed marked increase in leucocytes. Smear failed to reveal any bacteria and culture was negative. Spinal pucture twice daily was advised with intravenous administration of Pregle's iodine until culture would reveal the nature of the bacteria. Ventricular lavage and carotid injections were offered but refused.

The patient's temperature showed marked improvement remaining between normal and 100°, but the pain in the head persisted, being relieved by nothing. Spinal puncture was not performed very frequently because of objection on the part of the patient and low temperature. She progressed favorably with the exception of recurrent headaches and nausea until April 6, when the temperature again started to rise. She had also developed a slight lower facial palsy on the right side. On April 8, she became comatose. She was not seen by the writer until April 9, as he was unfortunately operating in another part of the State the two days previously. There was some increase in the Koenig's reaction, and some suggestion of ankle clonus on the left side. The knee jerks were decreased. There was congestion of the veins of the right optic disc and some suggestion of papillitis. The left side was apparently normal. The temperature had risen on the 9th to 104°, pulse between 100 and 120. Patient was in deep coma. Examination of spinal fluid, removed on April 6, showed culture of staphylococcus aureus.

Patient was taken to the operating room and a Toby test was performed. The spinal puncture revealed a cloudy fluid. Spinal fluid pressure was between 6 and 8 mm. of mercury. Pressure on the jugulars, separately, caused a slight rise to about 10 mm. of mercury on both sides. The wound was then opened, granulations curetted away, more bone removed, and tegmen antri removed. The subarachnoid space was then entered, allowing the escape of a considerable amount of comparatively clear fluid which contained rather large floculi of fibrin or pus that was cultured. The spinal fluid removed contained 5,120 cells per cubic mm. but no record of culture could be found in the chart. As the was some edema beneath the chin, the incision was enlarged somewhat downward, but no area of pus was found in the neck. Rubber dam was introduced into the subarachnoid space and sutured to the edge of the wound. Iodoform packing was inserted into the antrum and the remainder of the wound. Permission for ventricular lavage was not granted. Patient left the table in fairly good condition. The entire operation was done without any anesthesia and with apparently no feeling on the part of the patient. Operation was completed about 5 P. M. and the nurse's notation at 10 P. M. stated that the patient complained of pain in the right side of her head and of being cold. By the next morning the patient was joking with her physician. The temperature, however, remained high, reaching 105.4 and the pulse 130, and respirations 27. On the 11th and 12th of April the patient was rather talkative, relapsing at times into delirium or coma. The wound drained very profusely. The patient complained very little of headache but gradually became weaker and finally expired on April 14, at 2:30 P. M., after the temperature had been ranging between 103 and 104, the pulse 150 and upwards and respirations about 60 for the forty-eight hours preceding death.

This case presented many interesting features. In the first place, the intense pain in the ear and the headaches were present from the very onset of the case. These phenomena are rather common in cases of sclerotic or diploic mastoids. In both the foregoing cases and this there was no history of a previous otitis to explain the apparently extreme density of the bone, as it was denser than an ordinary diploic mastoid. Again we have a failure of the free opening of the tympanic membrane to relieve the symptoms. The leucocyte count at no time exceeded 11,850 with 70% poly morphonuclears, and at no time were the symptoms of meningitis present in their entirety, ankle clonus being only suggestive, Babinski negative, knee jerks at first increased and later decreased. The spinal fluid while

not under exceptional pressure, contained as high as 5,000 leucocytes and the staphylococcus aureus.

Though no post-mortem was made there were no localizing symptoms pointing to a brain abscess for, while the pulse was not excessively rapid except at the end, there was no distinct slowing at any time, no confused speech, and no paralyses except at the very end when there was a facial weakness. The most remarkable fact about this case is that the patient, being unconscious for two days, and operated upon without any anesthesia, after drainage of the subarachnoid space regained consciousness and was relieved of her headache. Unfortunately, the writer did not have the opportunity to study this case closely more than three times. Had we been granted the privilege of doing ventricular lavage and intracarotid injections there might have been a possibility of turning the tide in her favor. Our reason for feeling this might have been so, is the slow progression of the symptoms and the continued low temperatures until subarachnoid space drainage was done, after which the temperature remained continuously high. Should future cases of meningitis be encountered our feeling would be to again attempt drainage through the tegmen antri. Dr. Eagleton is apparently of that view at present, according to a verbal statement recently made to the writer.

The last case occurred in a young colored boy, twelve years of age, who had suffered from otitis media for about eight years, receiving treatment at a clinic for about four years. After a period of pain in the left ear for about four days, with rising temperature, the child was admitted to the Graduate Hospital in the service of Dr. Walter Roberts, on August 6, 1929. His temperature was 102°. There was found a discharging left ear and some tenderness over the mastoid. There was marked swelling of the glands of the neck and the patient was apparently very acutely ill. There was a disinclination to being disturbed, headache, and apparently photophobia. There was some stiffness of the neck. The heart, lungs and abdomen were normal. There was no Koenig or Babinski reaction. X-Ray revealed a general obscuring of the cellular outline of the mastoid. The blood count was 3,300,000 red blood cells, 66% hemoglobin, 11,600 leucocytes, with 75% polymorphonuclear, 22% small lymphocytes, and 3% transitionals. The urine examination was negative. Pediatrician's diagnosis was acute cervical adenitis with meningismus, probably secondary to mastoiditis. Operation was performed August 7, 1929, a simple mastoidectomy being done. On removing the cortex the mastoid structure was found necrosed and full of pus. There was a sudden gush of about one ounce of foul pus mixed with thin fluid. Further removal of bone revealed a large perisinus abscess lines with a yellowish pyogenic membrane. The sinus was somewhat suspicious but was not opened. The middle ear contained granular material probably cholesteatomatous. Drainage was introduced into the wound.

Following the operation the patient showed no improvement but the leucocytes started to rise, going from 11,600 on the 6th of the month to 18,000; polymorphonuclear 75 to 78%. Patient also developed a chill. Toby test, performed upon the 8th, peculiarly enough, was negative. He was seen by Dr. Yaskin on the 9th, who reported that the patient had unmistakable evidence of meningeal irritation probably sympathetic, that there was no evidence of abscess formation at that time, and that the general impression was one of sinus thrombosis for which he would recommend operation. The sinus was exposed that same afternoon, having first ligated the jugular low down in the neck. It was this ligation of the jugular that gave a clue to the prognosis of the entire case, for the jugular vein was thrombosed as far as the subclavian vein. When cut across before ligating, there was no bleeding from either end and a probe passed towards the mediastinum as far as possible, with removal of clot, allowed no escape of blood but merely a little hissing of air upon inspiration. On opening the lateral sinus the clot was found to be much younger and bleeding was readily obtained, leading to the conclusion that the clot had evidently begun in the jugular bulb and traveled downward toward the mediastinum, infecting the glands of the neck and causing the septicemia before it had affected the lateral sinus. A fatal prognosis was immediately given and the patient almost expired on the table. His temperature continued to be septic in character for about forty-eight hours and then became more steady, ranging between 101° and 103°, until the fourth day after operation when patient had a chill and his fever rose to 105°. His pulse remained between 110 and 130; the respirations about 22 to 28. He was steadily losing ground although given daily injections of Pregle's Iodine.

When seen by Dr. Yaskin on August 12, 1929, he made a notation that the patient was unable to recognize people, had cerebral screaming, vertical spontaneous nystagmus, absence of reflexes, and no localizing evidences. He could find no localizing symptoms on the 14th or 19th. The patient continued to be toxic with respirations rising to 44 on the 19th, after which an examination by Dr. Carpenter showed an effusion on both sides of his chest, in addition to pneumonia. Pregle's Iodine was stopped and he was given 50 c. c. of Huntoon's Antibody Solution. On the 17th Dr. Spaeth reported a beginning bilateral papilitis which had receded considerably in the left eye but remained unchanged in the right eye on the 19th. On the 20th, however, there was a very marked increase in the papillitis in both eyes which remained until the end. He had, in all, four transfusions, and on August 25, 100 c. c. of pus was aspirated from the chest. He steadily declined in spite of all treatment, and died on August 25.

Post-mortem findings were multiple abscesses in both lungs (all lobes), with atelectasis of the left lower lobe; bilateral empyema; vegetative endocarditis of the mitral valve; acute myocarditis; splenitis; hepatitis; and a bilateral nephritis, in addition to the suppurative mastoiditis, extradural abscess and lateral sinus thrombosis.

The main point that this case brings home is the practical impossibility of bringing about recovery in a case of thrombosis where the focus and its ramifications cannot be reached and eradicated. The writer has never seen recover a case of lateral sinus thrombosis with the extension of the infection beyond the point where it can be circumvented in the jugular vein. The infection has already had an opportunity to reach the lungs before the operator can block it off. The most remarkable fact of this case is that the Toby test was absolutely negative, despite the fact of the complete occlusion of the jugular vein.

Lung Abscess

The majority of lung abscesses develop in connection with bronchopneumonia. Influenzal pneumonia is particularly liable to such a complication. In a pneumococcus inflammation of the lungs an abscess is seldom seen. In the fibrinous lung inflammation of the emphysematous, pulmonary abscess is not an uncommon sequela.—*Dolley, Calif. W. Med.*, Jan., 1930.

Assmann (*Radiology*, Feb. 1930) shows that isolated, rounded foci of varying density, usually situated just below the clavicle, in the lateral part of the pulmonic field, are evidence of incipient tuberculosis of the lungs in young adults.

Prevention and Management of Deafness, With Special Reference to the School Child and Adolescent

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The importance of preserving and conserving the normal function of hearing is something that has not been sufficiently stressed or recognized. From authoritative conclusions based upon examinations of school children in this country we have the appalling figure of nearly four million deafened children. It is thus seen that the attempt to prevent and control deafness must commence with the pre-school and school child. For it is the child with the chronic running ear or neglected case of nose and throat infection who is the potential deaf child of tomorrow.

Leading otologists stress the fact that they invariably find in the adult deaf case a history of chronic otitis during infancy. It is of utmost importance, therefore, that a child, subject to frequent head or throat colds, should have his ears carefully observed and the hearing properly tested. Likewise children with a constant secretion from the ears should be examined by an otologist with a view to determine whether the discharge is merely wax or due to a chronic otitis.

I shall not consider the deaf mute at this time, such cases belonging in proper institutions equipped with expertly trained teachers to handle them. However, it can be said here that if a child has not attempted to speak before his fourth or fifth year he is probably completely deaf and should be considered a deaf mute. My concern in this presentation is mainly with the detection and proper handling of cases of acquired deafness. Modern science has eradicated many diseases that took terrible toll annually from civilization; it has been the means of controlling the incidence of other infectious epidemics, and has likewise lengthened the span of life as well as diminished the maternal death rate and infant mortality. In the same manner will the incidence of deafness be diminished if proper investigations and precautions are instituted. This problem of course is gigantic in scope and its proper handling requires complete coordination and cooperation between the schools, educational boards, parents, otologists, lay organizations philanthropically inclined, and civic groups desiring to promote the welfare of their communities.

Of utmost importance is the parents' cooperation. The hearing of their children depends upon their willingness or disinclination to regard with sufficient seriousness any existing chronic ear catarrh. It is their duty likewise to have a child's hearing tested after he has recovered from an attack of measles, scarlet fever or diphtheria even though no ear complications are present, for these three, of all so-called childhood diseases often leave their mark on the inner ear or on the auditory nerve. Children should not be allowed to go swimming while suffering from head colds, because at this time their sinuses are congested and may contain pus which can easily be forced into the eustachian tube, thus finding its way to the middle ear. Children should be taught the dangers of picking their ears or of inserting foreign bodies therein. The results of these two actions may be infection of the canal or rupture of the drum. Improper or forcible nose blowing can also sometimes cause spontaneous drum rupture.

The child who is handicapped by deafness often develops a very pathetic personality. He is constantly straining to hear what is being said to him; he appears to be dull and non-attentive; he begins to shun his schoolmates; he develops an inferiority complex or a pugnacious attitude, and cannot even adapt himself to his home environment. Such a child as a result of his physical handicap becomes backward in his school work, morbid and abnormal in his reactions, and is often a potential candidate for delinquency. Very frequently such a child if discovered in time and sympathetically handled by the school teacher, can be saved from this fate if the underlying causes are treated at the same time.

Children coming under the category of the deafened should be scientifically trained and schooled in the method of lip or speech reading by specially trained teachers, but should not be wholly isolated from the contact and companionship of normally hearing children. The deafened child also requires additional physical rest and should be under the care and observation of an otologist or in attendance at an ear clinic. He should likewise be provided with normal recreation with his more fortunate companions and never be made to feel that he is a burden to his friends. Parents should encourage him to practise his lip reading at home and should cooperate with the school as to the rate of his progress.

Besides lip reading there are many mechanical devices that can be utilized to increase the efficiency of hearing. These devices come under two classifications, namely, the non-electric and the electric. Of course, they are usually used by adults only. The non-electric is often the simplest and most helpful; but due to the conspicuous size and shapes of these horns and tubes their use is unfortunately less popular. The electric type or audiophone, of which there are numerous varieties, is less conspicuous and works on the combined principle of a radio and telephone. It gives much satisfaction and pleasure to those who learn to utilize it. But here one must beware of many forms of quackery and false claims by unreliable concerns.

Only those instruments approved by qualified otologists should be used, as there is nothing more discouraging than for a deafened individual to be forced to cast aside an apparatus fraudulently advertised which gives no desired effect. The despondency and despair in such cases often leads to complete mental collapse and even to suicide. Of course no mechanical device has as yet justly claimed a complete restoration of hearing, nor will any conscientious otologist profess to be able to cure a condition that has advanced too far. But if proper methods are instituted to arrest the progress of that condition or to bring about some improvement in the degree of deafness present, a great deal will have been done to restore the happiness of the individual and to rehabilitate him in his natural environment.

Hard of Hearing Clubs or groups should be constantly encouraged. To demonstrate results of such activities one has but to point out the far-reaching effects which the New York League for the Hard of Hearing has accomplished in the past decade through its various branches. Such a branch in this community would not only indicate a step in the direction of civic progress

but would also create for the deafened some of the following benefits, as outlined by the League:

Maintenance of a gathering place on common grounds
Promotion of lip reading instruction by trained teachers.
Vocational guidance and employment bureau for adults and juniors.
Recreation and entertainment.
Educational clinics for children.
Clinics for prevention of deafness.
Authentic information regarding hearing devices.

In closing we should be reminded that hearing once damaged to an advanced degree is rarely if ever restored. Thus such cases face the prospects of unhappy, unsuccessful and lonely existences. Should they be allowed to drift along that path or should every phase of modern science be brought to bear to improve their condition and help them find self-expression, happiness and comradeship through proper aid and direction? It is therefore obvious that to prevent deafness we must begin at its very inception in children, by frequent examinations and rectification of all causative factors; then by impressing adults with the necessity of treating their ear, nose or throat defects early and vigorously; and lastly, by encouraging those already deafened to utilize the best and most modern methods to help them alleviate their existing physical handicaps and thus participate actively in normal environments.

240 State Street.

Demonstration of an Instrument for Determining the Coagulation Time of the Blood

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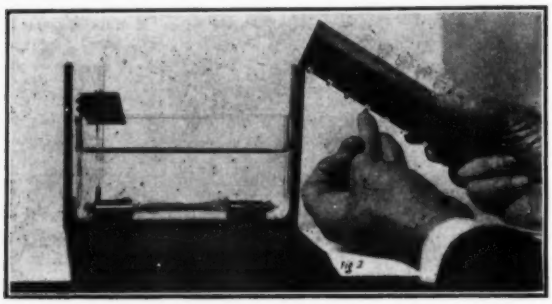
Philadelphia, Pa.

In 1913, we introduced to the profession a coagulometer which we felt contained the best principles of the several varieties then in general use.

The instrument proved to be very satisfactory, but possessed some disadvantages which militated against its universal acceptance.

We have attempted in this instrument to overcome the necessity of using more than one instrument in obtaining a complete reading at one sitting.



The instrument consists of a glass container rectangular in shape, length being six and one half inches; width one and one half inches; height four inches; a bakelite cover pierced with eight openings—one for the thermometer and seven for the glass rods with which the actual test is made. This fits in a small leather container. The rods are three and one quarter inches long with a tapered end which measures four millimetres in diameter. The ends are highly polished.

The principle of the test is to determine how long a time must elapse for the clotting to occur in a drop of blood placed on the end of the glass rod (at body temperature). This method of determining the time is applied by immersing the tubes at stated intervals in water of a temperature approximating blood heat.

From repeated tests on normal blood, we know the normal clotting time with this intrument is between five and seven minutes.

Technic of Using the Instrument

1. The container is half filled with water of a temperature of ninety-nine degrees. The cover is replaced and all the rods are brought in contact with the water for half a minute in order to raise the temperature at these ends to about body heat.

2. The cover is then removed and the rods are dried. The rods are pulled upward so that when the cover is later reapplied, their tips are about one quarter of an inch above the water.

3. The finger or lobe of the ear of the patient—having been previously cleansed with alcohol—is given a smart prick with a needle and the first drop of blood is mopped away. No squeezing should be employed. The blood must come without any pressure.

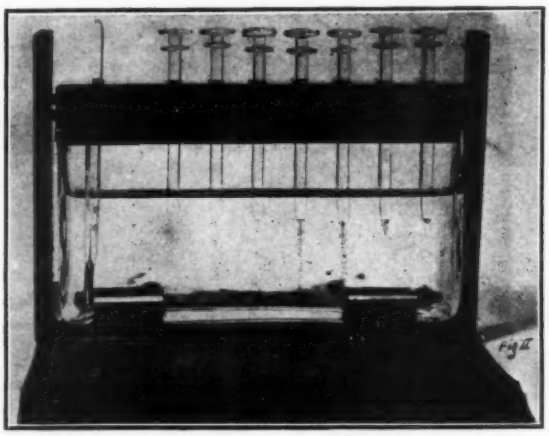
4. An even film of blood is then placed on each tip of the rod—care being exercised to avoid contact with the skin—or getting the blood over the sides of the rod. Fig. I.

5. The cover is replaced and the time noted.

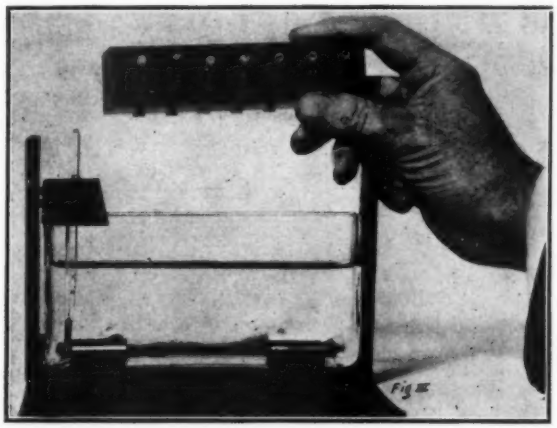
6. At one minute intervals, a rod is pushed into the water. The rod should not be plunged in violently but gently eased into the water.

Interpretation of Tests

In a normal case, the blood will be washed away from the first rods placed in the water. To the casual observer,

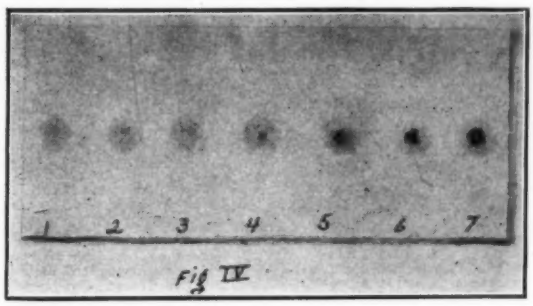


there will appear to be little or no difference in these responses. After some experience, however, one will note that the blood coming from rod number two remains visible for a shorter period of time and the pre-



cipitate falls in an almost straight line from the rod to the bottom of the container. Rod number three is next immersed. One will see a heavier precipitate which reaches the bottom of the container in a shorter period of time. When rod number four at the end of four minutes is pushed in, the precipitate is not only heavier but shows a tendency to clump. Not infrequently a flake of blood will cling to the rod for several minutes or even remain fast at the end of the test. Rods numbers five and six in the average normal case show a distinct heavy clumping and, as a rule, only a part of the drop of blood washes away. Rod number seven at the end of seven minutes will show little or no change in drop when immersed in the water. At times, a very faint washing off occurs, especially if the drop was not evenly distributed on the tip. This phenomenon has no significance. Fig. II.

The cover is now removed and the rods are held



toward the light. (Fig. III.) Observe the color and extent of the clots on the tips.

Each rod is now gently mopped off with a towel and the texture and extent of the clot observed. Fig. IV.

As stated previously, the normal case shows clotting beginning at four minutes and completed at seven minutes. A variation of from five to eight minutes has little clinical significance, however.

In a given case, where no attempt at clotting occurs after four minutes, we wait two minutes before immersing rod number five; if none occurs at this time, we wait two more minutes before immersing rod number six. This interval may be shortened or prolonged in any case depending on the judgment of the operator.

In our experience, the personal equation of the operator must always be taken into account in judging the accuracy of any instrument and experience alone stabilizes this factor.

In this particular instrument, after a dozen or more cases are studied, the technic is mastered and accuracy is assured.

2025 Walnut Street.

Prevention of Blindness

Adoption of a general standard of blindness throughout the world is recommended in a report from the Health Organization of the League of Nations received here by the National Society for Prevention of Blindness. The recommendation is included in a study of the welfare of the blind in 26 countries. The report from the League of Nations states:

"The very considerable variety of practice and the varying standards of the different countries point to the desirability of the adoption of some general standard of blindness throughout the world, which would not only tend to secure a greater uniformity in the treatment of the blind but would also be valuable from the points of view (1) of comparison of statistics of blindness between various countries and (2) of showing more precisely the extent of the real administrative problem of the blind in various countries.

"It is doubtful how far the adoption of such a uniform definition would be practicable, because a change of definition, in countries in which public assistance is given to the blind as such, would have one of two effects: It would either deprive some persons of the benefits which they are now receiving or it would involve the public authorities in increased expenditure. But if the attempt were made, the first step would be to decide how many definitions are needed and for what purposes; e.g., for census purposes, for educational purposes and for the purpose of adults in such matters as training and employment and financial assistance.

"When the administrators have determined for what purposes the definitions are needed, the definitions themselves might be drawn up in relation to the medical facts in a uniform way through some pronouncement by an international body of eye specialists meeting in conference. But, while there would be obvious advantages in uniformity among different countries in the definition of blindness for specific administrative purposes, it seems that there must be different definitions for different purposes, and that one definition for all purposes is impracticable.

"In ordinary speech, blindness usually connotes a total lack of sight in both eyes, though the ordinary man may also regard as blind those who have only perception of light, or are unable to find their way about. But when administrative action for the welfare of the blind is in question, it is necessary to define blindness with some regard to the disability of the blind person in certain defined respects. For example, the definition of blindness in the case of a child must have regard to the extent of his inability to receive instruction through normal methods, and in most countries the definition of blindness for an adult will have regard to the degree of difficulty he experiences in undertaking employment in which eyesight is required.

"A number of countries have recognized the desirability of two distinct standards and have laid down separate definitions for children and adults. Others have different definitions for administrative and statistical (census) purposes. Even where no distinction for different purposes is made in official or other definitions, a differentiation is usually made in actual practice."

For the purpose of the United States census, the League of Nations' report mentions, instructions to enumerators in 1920 ran as follows: "Include as blind any person who cannot see well enough to read even with the aid of glasses. The test in the case of infants must be whether they can apparently distinguish forms and objects, and, in the case of older persons who are illiterate, whether they can presumably see well enough to read if they knew how to read. Do not include any person who is blind in one eye only."

Difficulties are encountered in attempting to arrive at a total figure for the blind population of the world, the Health Organization explains; only a rough estimate can be made, especially in view of the fact that no general agreement prevails as to the exact condition which constitutes blindness. A very conservative figure of 2,390,000 is quoted as a "probable under-estimate" made in 1910, together with the statement that other estimates have been made up to 6,000,000. In those countries where a census of the blind cannot be obtained, it is said, the prevalence of blindness is frequently great.

Avoiding Influenza

To lessen the danger of infection from influenza, when there is an epidemic, keep away from crowds or assemblages of people; filter the air breathed by cotton plugs placed in the nostrils; apply lanolin to the lips and nose and wear spectacles to protect from spray from coughing persons. Disinfection of the nose, throat and mouth is always a wise precaution.—Dr. P. Schmidt, in *Deut. med. Wchnschr.*, Jan. 25, 1929.

Resume of Methods in Cardiac Diagnosis*

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The object of this paper is to present in as concise a form as possible the subject of the present day methods in cardiovascular diagnosis. Purely clinical observation without exact laboratory corroboration often leads to incorrect and hasty conclusions, except such diagnoses as are made by the rare clinical genius or in cases where the diagnosis is obvious.

Cardiac diagnosis is built up from the data collected by a variety of methods. The most important means at our disposal include a painstaking history and a careful physical examination. We will not concern ourselves with these as they are thoroughly described in the standard text books on physical diagnosis. The measures to be considered are electrocardiography, X-ray, fluoroscopy, cardiac functional test, polygraphy, vital capacity, arterial and venous pressure determination and oscillometric and basal metabolic readings.

Electrocardiography

Changes in electrical potential occur with every contraction of the heart. With Einthoven's invention of the string galvanometer and the many modifications thereof, it has been possible to register these changes in electrical potential in the heart. The instrument of precision, which we term the electrocardiograph, consists essentially of a powerful electro-magnet between two poles of which is stretched an exceedingly fine conducting fiber made of silvered quartz. When a current passes through this fiber, minute movements take place. The shadow of the oscillating fiber is magnified and projected on photographic paper. The changes in electrical potential which take place in the heart during contraction produce a record which is called an electrocardiogram. The current is led off from the patient by means of two electrodes. Such a derivation is spoken of as a lead. In every electrocardiogram three leads are recorded, because different parts of the heart attain different degrees of electrical potential during cardiac contraction. The leads chosen are as follows:

Lead I—Current from right and left arms.
Lead II—Current from right arm and left leg.
Lead III—Current from left arm and left leg.

The electrocardiogram often reveals unsuspected conditions and serves as a check on diagnosis, but the tendency and temptation to diagnose cardiac disease by the electrocardiogram alone can only bring disrepute and skepticism on a valuable method by unfounded and hyperbolic claims. It must be remembered that not all cardiac conditions are revealed by the electrocardiogram and at no time should a final interpretation be made without correlating the findings with those revealed from the history and physical examination.

Just what does the electrocardiogram tell and what do we really learn from it? Variations from the normal rhythm yield themselves readily to analysis. Auricular fibrillation, auricular flutter, extra-systoles arising from a focal point or from multiple foci, marked sinus arrhythmia and various forms of heart block are easily interpreted. Early signs of auriculoventricular and arborization block are also revealed. The electrocardiogram is also influenced by myocardial degeneration, valvular disease, coronary disease, active rheumatic infection, hypertension, chronic interstitial nephritis, dextrocardia, thyroid disease, etc. It may also be used as a means of controlling the administration of digitalis.

The progress of any cardiac case can often be ascertained by a series of comparative electrocardiographic studies.

CASE REPORT: A middle aged female was admitted to the hospital complaining of severe upper abdominal pain. History and physical examination pointed definitely to cholelithiasis. The electrocardiogram showed definite evidence of coronary disease.

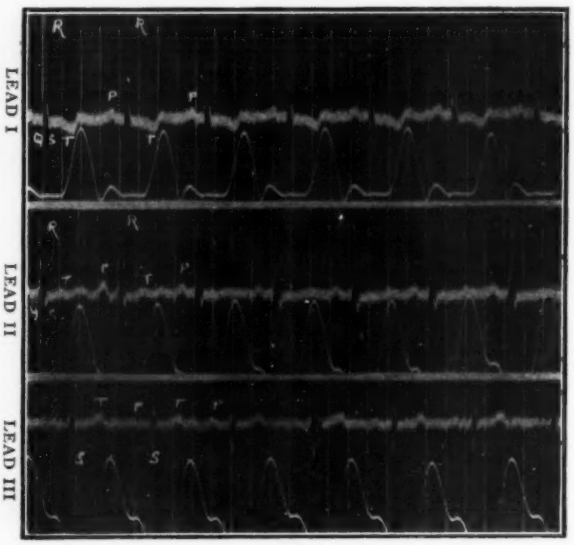

Fig. 1.—Electrocardiogram showing evidence of impaired coronary circulation. The T. wave is inverted in Lead I and is diphasic in Lead II.

Patient was subjected to operation and the gall-bladder was found to be full of stones. Several days after the operation, patient had a recurrence of the original symptoms and she was certain that some of the stones were left behind. However, because of the electrocardiographic findings, the cause of this pain was clear. She has responded very well to the usual regimen prescribed for coronary disease.

This is one of the many cases where the electrocardiogram was extremely valuable in arriving at a proper diagnosis.

Polygraphy

In recent years the rapid development of electrocardiography has more or less replaced polygraphy. However, the pulse tracing may yield valuable information and should be routinely recorded with the electrocardiogram in order to recognize pulsus alternans and pulse deficits. A simultaneous arteriogram and electrocardiogram can be obtained by attaching a sphygmograph to the

* Read before the South Branch of the Philadelphia County Medical Society, May 1929.

camera. Figure 2 illustrates a simultaneous arteriogram and electrocardiogram taken during an attack of syncope revealing a marked pulse deficit caused by a paroxysm of ventricular extra-systoles. Figure 3 illustrates a case of pseudo-alternation of the pulse. It is frequently impossible to recognize these conditions from the electrocardiogram alone.

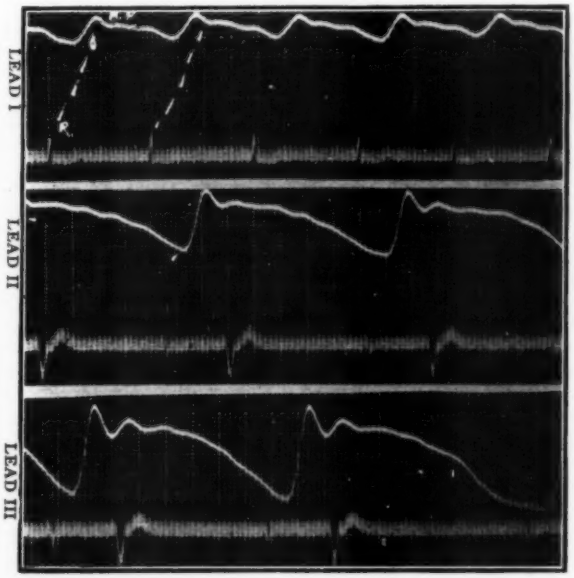

Figure 2. A simultaneous arteriogram and electrocardiogram taken during an attack of syncope revealing a marked pulse deficit caused by a paroxysm of ventricular extrasystoles.

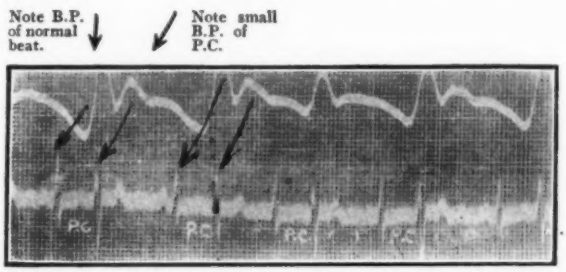

Figure 3. A bigeminal rhythm causing a pseudo alternation of the pulse.
Note: B.P.—Brachial Pulsation
P.C.—Premature Contraction.

As a diagnostic procedure, polygraphy does not reveal as much as the electrocardiogram. The interpretation is much more difficult and far less accurate and therefore rarely employed.

X-Ray

The roentgen ray is a most valuable and indispensable adjunct in the diagnosis of cardiac disease. The exact size and shape of the heart can thus be obtained. In many instances, it is very difficult or nearly impossible to outline a heart by palpation and percussion, as, for example, in emphysematous or extremely obese patients, in cases where the thoracic wall is unduly developed, and in women with large, pendulous breasts. Even when these conditions do not exist, it is rare that two physicians outlining the same heart should find it to be of the same size, shape and position.

By means of teleroentgenography, i.e., photographing the heart by placing the plate over the chest with the tube at a distance of six feet from the patient, the exact size, shape and position of the heart are obtained.

The orthodiagraphic method is also frequently employed for this purpose. The patient is placed between the source of light and the screen and the outline cast by the shadow of the heart in its different dimensions is drawn upon the screen from which it can be accurately reproduced and measured. With orthodiagraphy and teleroentgenography records are obtained which can be compared with previous and future ones. Figure 4 shows the gradual improvement in the size and shape of the heart in a case of arrested carditis while Figure 5 demonstrates progressive cardiac enlargement in a mildly active case of rheumatic infection.

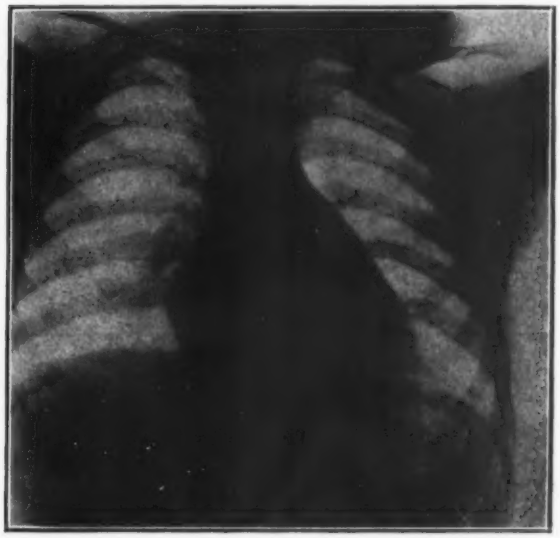

Fig. 4.—No. 1.

Fig. 4.—No. 2.

The X-ray reveals:

1. The type of cardiac contraction.
2. The bulging of various chambers and vessels.
3. Valvular disease, i.e., we find the globular configuration in mitral disease and the aortic configuration in aortic disease.
4. Aneurisms and their sites; the amount of enlargement in cardio-renal disease; jug-shaped silhouettes,

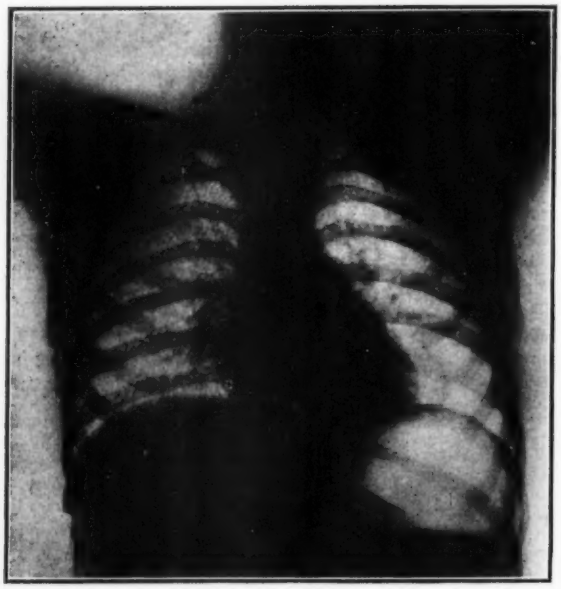

Fig. 4.—No. 3.

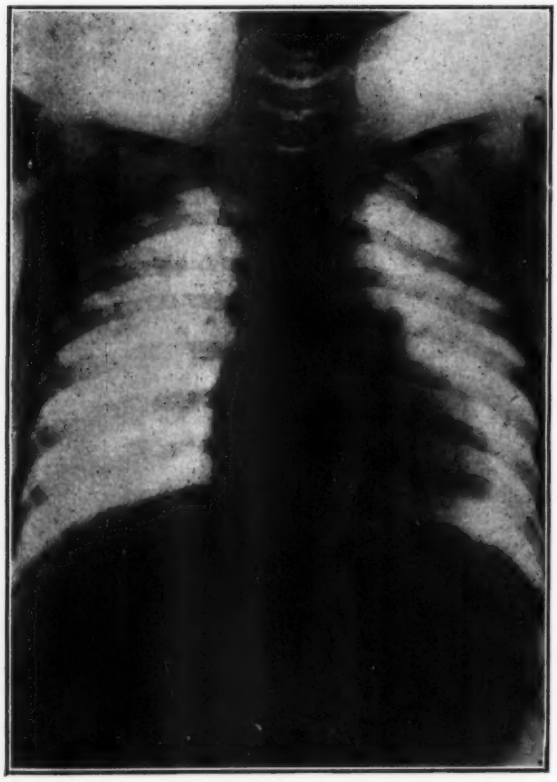

Fig. 5.—No. 1.

frequently equidistant from the midline in pericardial effusion, etc.

Emphasis should be made on taking antero-posterior and lateral views.

A peculiar relationship, sufficiently important to warrant discussion, exists between the gas in the stomach and the heart. Distention of the stomach and intestines by gas may be responsible for cardiac symptoms ranging from a sensation of slight pressure to anginoid pains. By means of the fluoroscope, this condition can be easily recognized.

Cardiac Functional Test

In the light of our present knowledge, we fully realize that it is not the extent of an endocardial lesion, the loudness of a murmur or the type of arrhythmia that is the determining factor of the actual condition of the heart, but the state of the heart muscle and its ability to

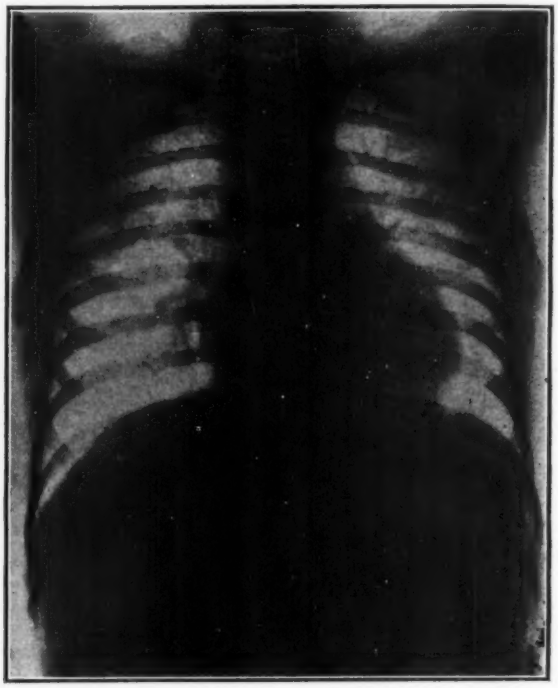

Fig. 5.—No. 2.

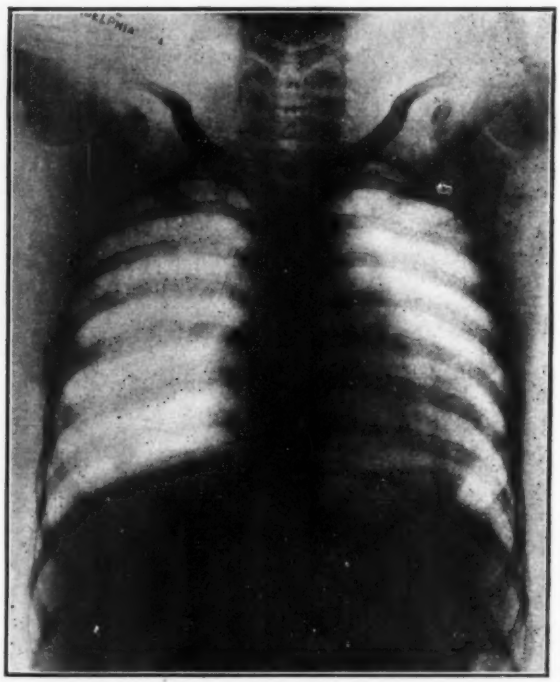

Fig. 5.—No. 3.

stand up under the load of daily physical strain. It seems rational to believe that any cardiac pathologic condition which is not compensated for will diminish proportionately the cardiac reserve force. Hence, any simple and accurate method by which the reserve force could be determined should prove to be of value. This is accomplished by observing the individual's response to effort.

Many tests are employed, namely, the hopping test, running, swinging dumb-bells, lifting weights, stationary bicycles, etc. These tests vary greatly with the individual —with his mental attitude and co-operation. Many will not take such a test seriously, but consider it more or less as a joke; hence, the value of the test is greatly diminished.

The instrument we employ is the cardiovascular dynamometer devised by one of us (J. B. W.). The

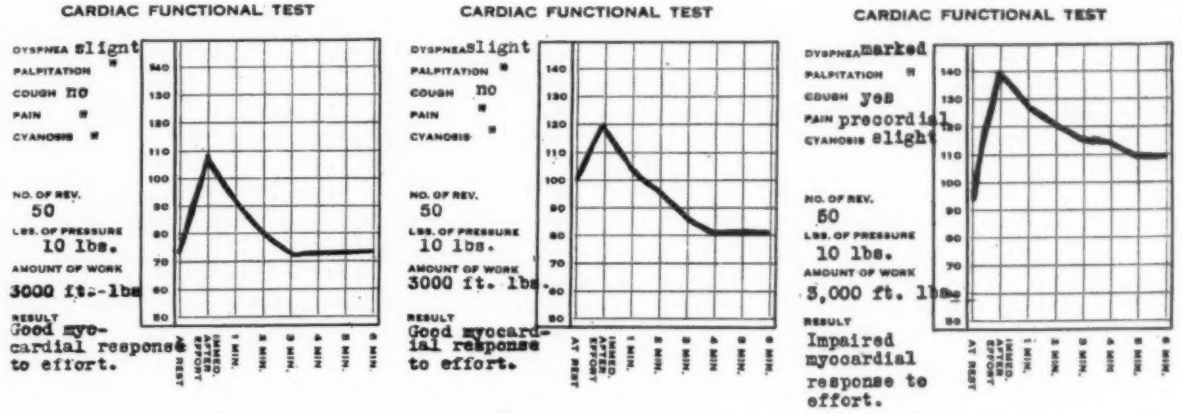

Fig. 6.—a—Curve showing normal response to effort. b—Effort curve frequently seen in cases of neurocirculatory asthenia. c—Curve showing impaired myocardial response to effort.

patient performs a predetermined amount of work by turning a wheel against a certain amount of resistance measured in pounds of pressure. The total amount of work in foot pounds is then easily calculated. The pulse is taken before and immediately after effort and thereafter once a minute until it has returned to pre-exercise rate. In determining the cardiac reserve force, dyspnea, palpitation, cyanosis, cough, pain and fatigue are taken into consideration.

The use of the dynamometer fulfills the requirements of simplicity in that it can be operated by a novice and it is practical in that the data obtained are of value in determining cardiac efficiency. Records can be kept of the first and subsequent examinations.

Vital Capacity

Vital capacity is another important procedure in evaluating a cardiovascular system. It is the amount of air which can be exhaled forcibly after a forced inspiration. The patient exhales into a spirometer and the volume of air is read from the scale on the instrument. The results are then compared with the average normal readings.

Recent studies tend to show that patients, even with the mildest decompensating hearts, have an unmistakable diminution in vital capacity. The cause is probably an engorgement of capillaries due to stasis which decreases the expansibility of the alveoli. The stasis perhaps occurs much earlier than the appearance of râles at the bases. Vital capacity serves more or less as an index of cardiac reserve. Its determination is of value only in conjunction with other findings.

Arterial Pressure

The auscultatory method is usually employed in ascertaining the arterial pressure. Variations in the blood pressure readings influenced by physiological and mechanical conditions such as psychic states and diurnal variations should be kept in mind and the range of variations within the normal limits in different individuals. It is advisable to take several readings at the same sitting.

In taking the blood pressure, particularly in hypertensive cases, it is important to note whether there is a tendency to alternation. We have observed that this is a warning sign of oncoming cardiac failure and, by exercising the proper precautions, decompensation may be postponed.

Venous Pressure

While venous pressure has not been so generally employed as arterial pressure, it serves as an index of myocardial power in moving the blood from the venous to the arterial side of the circulatory system and may warn us of an impending failing heart before the development of other signs and symptoms. As venous engorgement occurs, the venous pressure rises, and when the engorgement is reduced the pressure falls.

There are two methods, the direct and the indirect, which have been used for the determination of venous pressure.

In the direct method, a trocar is introduced into the median vein of the forearm and connected to a water manometer by a rubber tube filled with physiological saline solution. The arm must be brought to the level of the right auricle. The reading of the manometer indicates the number of millimeters of water of venous pressure.

The indirect method, of which there are several modifications, is preferable. The simplest of these, the one described by Gaertner, requires no apparatus. It is based upon the emptying of a prominent vein of the hand on elevation of the arm. Normally the veins empty when held at a level with the right auricle. The level at which the vein collapses is compared with the level of the right auricle.

Oscillometry

Oscillometry, which at first was used only for the measurement of arterial tension, recently acquired much greater importance, becoming a specific method for investigation of cardiovascular function. It is a method based on the expansibility of the arterial wall at the point compressed.

Many forms of apparatus have been devised for oscillometry. Pachon's sphygmomanometric oscillometer is the instrument generally used for the purpose. It con-

sists essentially of an aneroid manometer to indicate the pressure, a small and very sensitive manometer contained in the same case as the oscillometer, a pump and a cuff. The important point is that the manometer itself is immersed in a reservoir of air constantly at the same pressure as that in the cuff. On account of the absence of tension in the walls of the manometer, an indicator of great sensitiveness to the pulsations and more especially of constant sensitiveness is obtained. The cuff is applied to any part of the limb on which readings are to

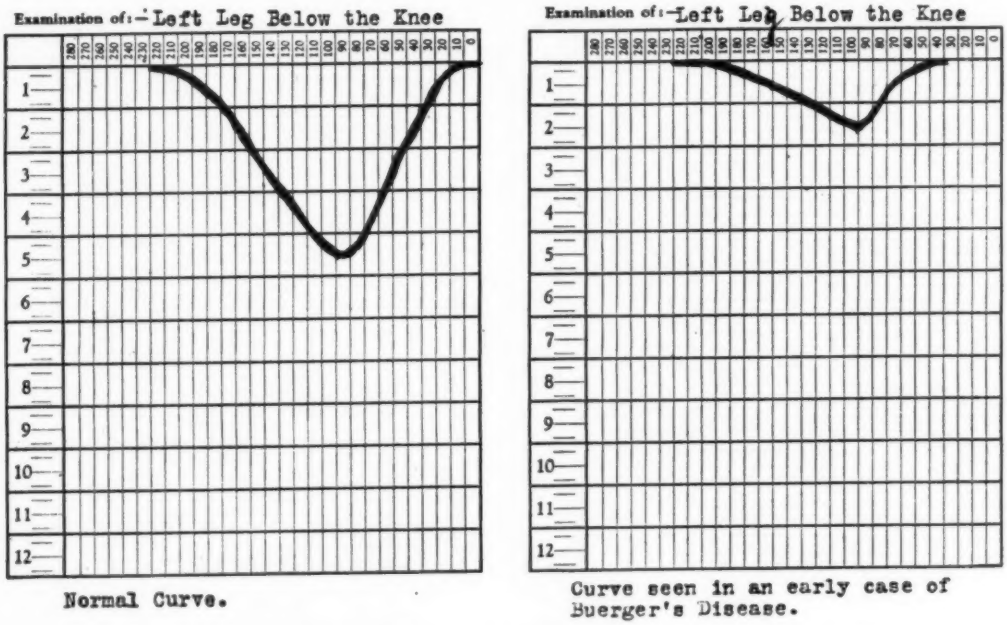
Examination of:—Left Leg Below the Knee
Normal Curve.
Examination of:—Left Leg Below the Knee
Curve seen in an early case of Buerger's Disease.

Fig. 7.—Oscillometric reading showing normal curve and the curve seen in an early case of Buerger's disease.

be made and sufficient pressure is applied to exceed the supposed maximum blood pressure so as to extinguish all oscillations. Then, by means of a valve attached to the apparatus, the pressure is gradually released and a stopcock placed on the rubber tube that connects the cuff with the instrument is opened. The amplitude of the oscillations is then read at different levels of pressure in millimeters of mercury.

The oscillometric method now extends its services to all fields of general medicine. In surgery, it can give important information concerning the peripheral vessels, in that the pulsations of the vessels compressed can l detected much better than by the palpation method, due to the extreme sensitiveness of the apparatus. Hence, the importance of the oscillometric readings in cases of thrombosis or embolism affecting the extremities, particularly when amputation is considered.

Figure 7. Diagrams illustrating a normal curve compared to one obtained in Buerger's disease.

Basal Metabolism

Basal metabolic readings, the same as urinalysis, Wassermann test, blood chemistry, etc., must be shared by the various departments of medicine. To the cardiologist, it is of utmost importance. We try, whenever possible, not to treat a case of tachycardia without a metabolic reading. While the exophthalmic goitre usually develops abruptly, hyperthyroidism is insidious in its onset and development and is frequently overlooked. The only symptoms which the patient may present may be referable to the cardiovascular system.

The myxedema heart deserves special attention for two reasons:

1. It is seen more frequently since surgery of the thyroid gland is so widespread.
2. It responds to thyroid and no other medication.

Conclusion

In order to properly evaluate a cardiovascular system, all available methods of examination should be resorted to. While a complete cardiovascular study at times only offers to the physician an accumulation of trifling advantages, in the majority of instances it leads to a more accurate diagnosis and therefore a more intelligent prognosis and management.

FIGURES

Figure 1:—Electrocardiogram showing evidence of impaired coronary circulation.
The T. wave is inverted in lead I. and is diphasic in lead II.
Figure 2:—A simultaneous arteriogram and electrocardiogram taken during an attack of syncope revealing a marked pulse deficit caused by a paroxysm of ventricular extra-systoles.
Figure 3:—A simultaneous arteriogram and electrocardiogram showing a pseudo alternation of the pulse caused by a bigeminal rhythm.
Figure 4:—Teleradiograms showing diminution in the size of the cardiac silhouette.

	cm.
Plate No. 1. 11-23-28	
Transverse diameter of the heart	9.3
" " " " chest	17.7
Plate No. 2. 4-19-29	
Transverse diameter of the heart	9.2
" " " " chest	18.5
Plate No. 3. 9-27-29	
Transverse diameter of the heart	8.6
" " " " chest	18.6

Figure 5:—Teleradiograms showing progressive enlargement of the cardiac silhouette.

	cm.
Plate No. 1. 6-10-29	
Transverse diameter of the heart	10.6
" " " " chest	19.7
Plate No. 2. 9-5-29	
Transverse diameter of the heart	11.3
" " " " chest	19.7
Plate No. 3. 12-2-29	
Transverse diameter of the heart	11.6
" " " " chest	19.8

Figure 6:—Effort curves showing—a. Normal response to effort. b. Curve frequently seen in cases of neuro-circulatory asthenia. c. Curve showing impaired myocardial response to effort.
Figure 7:—Oscillometric Reading showing normal curve and the curve seen in an early case of Buerger's disease.

In diagnosing carcinoma of the stomach and intestines, examination of the stool for occult blood is very important. X-ray will not tell the difference between cancer and ulcer, but it will tell that something is there.—*Am. Med.*

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Academy of Medicine, Wednesday, December 4, 1929

Therapeutic "Light" and Its Sources

M. J. Dorcas, Ph.D.
Cleveland, Ohio

This is a discussion from the viewpoint of a physicist of the therapeutic radiation obtained from the sun, carbon and quartz-mercury arcs and incandescent sources.

The sun, carbon and quartz-mercury arcs, and incandescent substances are frequently used as therapeutic agents. Their use is called helio-therapy, actino-therapy or light-therapy. The light from these different sources varies in important respects but from a physicist's viewpoint they are all in the same general class. They are not in the same class as X-rays, radium radiations or diathermy currents.

The history of the discovery of the physiological properties of these radiations and the development of their therapeutic applications form an interesting narrative but will not be considered tonight.

All the previously mentioned sources of radiant energy produce light and similar radiations. By "light" I mean visible light and by "similar radiation" I mean infra-red and ultraviolet.

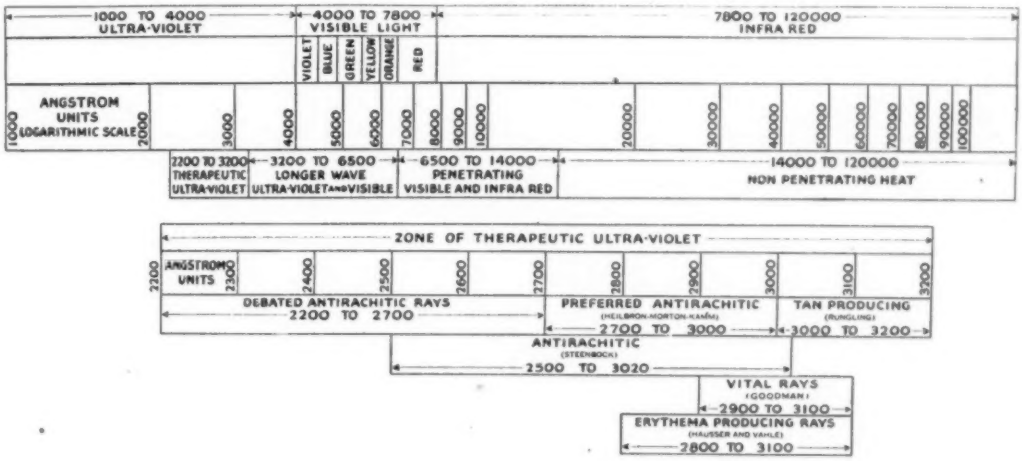
A way of distinguishing these radiations from each other is necessary. The easiest way to describe them accurately is to describe the place in the spectrum that they will be found. That is, we will spread the radiation out into a spectrum or row, each kind of radiation by itself in an orderly manner. Then we will set up beside this spectrum a scale with successive numbers. Each kind of radiation will be found in a definite place in the spectrum and opposite that place will be a number. We can use that number to describe the kind of radiation. This system will work for all kinds of radiation, visible or invisible, and we can use as many numbers as we require to give an accurate description of the position of the light or the kind of light.

Physicists have agreed to use the standard scale devised by the Swedish physicist, Angstrom. All the radiation, visible or invisible, can be described by this system of numbers, or, as it is called, in Angstrom units, sometimes abbreviated to AU or A. This unit also means the length of the supposed wave of light and one AU means 1/100,000,000 of a centimeter, but that need not concern us. The numbers represent to us different kinds of colors of light.

The ultraviolet is represented by numbers smaller than 4,000 AU. Visible light is represented by numbers 4,000 AU to 7,800 AU and infra-red is represented by numbers larger than 7,800 AU.

The different physiological effects of the different radiations can be indicated by a diagram such as this one:

The wave lengths are indicated by the numbers at the top and the physiological properties by the legends at the lower parts of the diagrams. These are explained in order as follows:



Non-Penetrating Heat Radiation, 14,000 to 120,000 Angstrom Units

Radiation of long wave lengths (14,000 to 120,000 Angstrom units), that is, radiation from solid bodies not heated to high temperatures, is stopped by thin layers of water. Therefore, this radiation cannot penetrate deeply. The nerve endings sensitive to temperature are near the surface of the skin. This skin surface is heated and we feel uncomfortable if we get too much of this radiation. An example of this is the discomfort felt if we get too near a very hot steam radiator.

This type of radiation is undesirable because the discomfort it causes limits the time and intensity of treatment.

Penetrating Radiation, 6,500 to 14,000 Angstrom Units, Red Light and Heat

Light is used to raise the temperature of tissue below the surface. This is sometimes called deep therapy, or the radiation called penetrating radiation to distinguish this treatment from that where the surface only is heated. This penetrating radiation, capable of heating tissues some distance below the surface, can be described as radiation of wave lengths 6,500 to 14,000 Angstrom units, that is, red light and short infra-red rays that are emitted by very hot bodies.

Long Ultraviolet and Visible, 3,200 to 6,500 Angstrom Units

Visible light of colors other than red, and the ultraviolet of long wave lengths have no well recognized physiological effect. This light is chiefly reflected from the surface of the skin and is not absorbed at all. It, however, is considered by some to have possible beneficial action in some physiological conditions. Different colors of visible light certainly have a psychological action.

Tanning or Pigment-Producing Rays. 3,000 to 3,200 Angstrom Units

A result of light treatment often associated with beneficial results is the pigmentation or tanning of the skin. Some physicians consider this the chief essential in a course of light treatments. This, according to Rungling. is a result of ultraviolet that can penetrate the skin far enough to reach the pigment-producing cells.

This is accomplished chiefly by ultraviolet of 3,000 to 3,200 Angstrom units.

Sunburn or Erythema-Producing Ultraviolet, 2,800 to 3,100 Angstrom Units

The sunburn or erythema produced by exposure to some light sources is associated with the beneficial results obtained. This erythema is considered by some to be a sign of an effective light source or a measure of an effective dose of radiation. The ultraviolet capable of causing this erythema has been investigated by Hausser and Vahle and found by them to be in general the wave lengths from 2,800 to 3,100 Angstrom units.

Hausser and Schlechter have investigated this subject further and found that for slight erythema the shorter waves within these same limits are relatively more important, while for severe erythemas the longer waves, that is near 3,100 Angstrom units, are most important.

The very short wave lengths of ultraviolet are comparatively ineffective in causing erythema, probably because they cannot penetrate through the layer of dead cells always present on the skin surface.

Recently Macht and Anderson have claimed that some animal tissues are capable of transmitting light of wave lengths shorter than 2,600 Angstrom units. This, however, apparently does not hold good for human skin.

Undoubted Antirachitic Ultraviolet, 2,700 to 3,000 Angstrom Units

Exposure to sunlight and some artificial light sources is effective in preventing or curing rickets and related disturbances involving the metabolism of calcium and phosphorus. The quality of ultraviolet responsible for this effect has been investigated. It has been found that ultraviolet of wave lengths shorter than 3,000 Angstrom units is chiefly responsible for this effect.

Possibly Undesirable Radiation, 2,200 to 2,700 Angstrom Units

Recently some experiments have raised the doubt that very short ultraviolet is of advantage in forming the antirachitic substance from the sterols. (The present generally accepted idea is that some one of the chemical substances known as sterols is changed into vitamin D by ultraviolet.) The statement has been made and defended that light shorter than 2,700 Angstrom units would decompose the vitamin D into a substance that had no antirachitic properties. It is possible that these decomposition products might be harmful. We, therefore, do not at present know whether ultraviolet of wave lengths 2,200-2,700 Angstrom units is good or bad. It may be that it is as desirable as ultraviolet of wave lengths 2,700-3,000 Angstrom units. It may also be that its effect is to partially neutralize the effects of the 2,700-3,000 band.

Ultraviolet Shorter Than 2,200 Angstrom Units

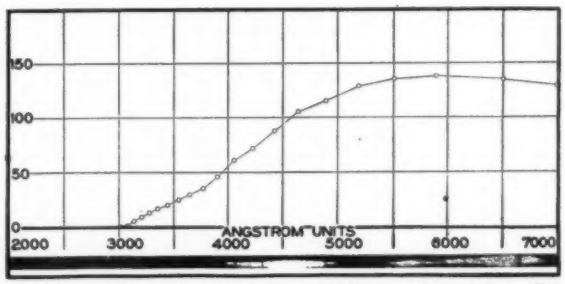
Radiation of wave lengths shorter than 2,200 Angstrom units can be neglected because no ultraviolet source in common use generates appreciable quantities of energy in this region. Photographs of spectra of open arcs in a vacuum apparatus show radiation down to very short wave lengths but practical sources are limited by the transmission of air and quartz, both of which begin to absorb at about 2,000 Angstrom units and completely absorb all radiation shorter than about 1,850 Angstrom units. The energy of 2,000 to 2,200 Angstrom units from any practical light source is only a few thousandths of one per cent, and even if it were available in measurable quantities it probably would be physiologically inert because it could not penetrate even the outside layer of dead skin cells.

No doubt in time our ideas of the exact limits of these various boundaries may change slightly and other regions of other effect will be clearly defined, but this division is the best available at the present time and is believed to be essentially correct and exact.

The physicist can thus describe the kinds of radiation that produce different effects. The decision of when to use them for the treatment of disease is a medical one and must be made by the physician.

It is possible to investigate various light sources and determine their relative and exact amounts of the various kinds of energy previously described.

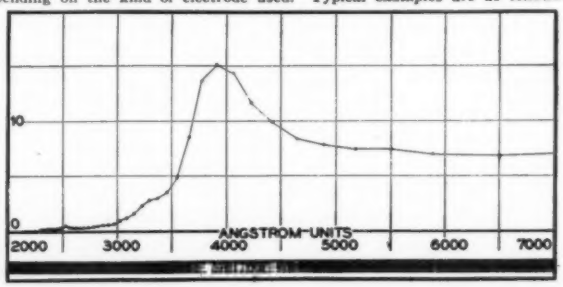
The photograph of the spectrum tells us what kind of light is present. A photograph of the spectrum is qualitative in that it shows us only what kinds of energy are present. A more complete story is told by the curves of the distribution of energy that can be shown with photographs as follow:

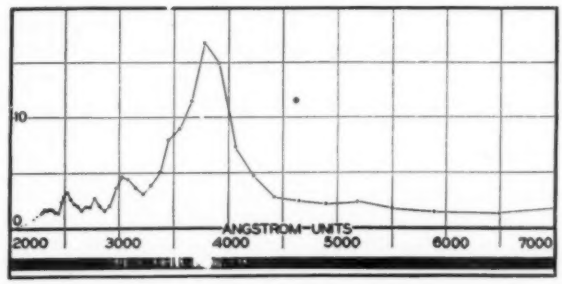


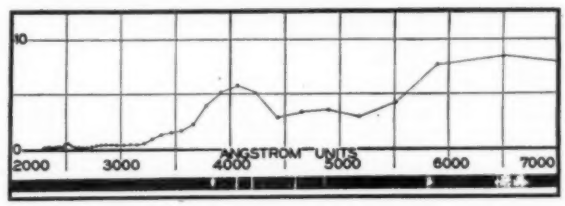
This chart shows the spectral energy distribution of mountain sunlight (Curve 1). For convenience in interpreting this chart, the divisions of the Angstrom unit scale previously described have been reproduced below the chart.

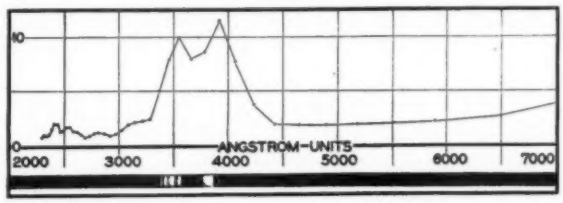
Incandescent light bulbs and infra-red heaters give continuous spectra from the far infra-red to the short wave end of the visible light region. They all give smooth curves of the spectral energy distribution. The exact position of the peak of the curves varies with the temperature of the source. The peak of the curve is found to move toward the shorter wave lengths as the source becomes hotter.

With carbon arcs it is possible to get many kinds of radiation depending on the kind of electrode used. Typical examples are as follows:

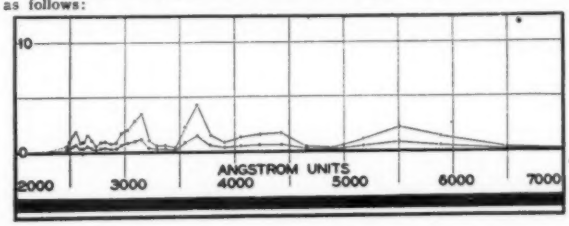








The quartz-mercury arc has radiation that gives a picture and curve as follows:



The above charts and curves showed the relative proportions of different kinds of radiation in the different light sources.

The relative amounts of the same kind of radiation in different light sources depend on the intensity of the source. For instance, outdoor sunlight will be more intense than the small incandescent bulb used in a flashlight at a distance of a foot, but less intense than one of the enormous bulbs used for floodlighting purposes at the same distance.

The amount of radiation obtainable varies approximately as the input of energy. All the types are of radiant energy sources and are available in a variety of sizes. The variations of energy consumption are about as follows:

Incandescent Bulbs	1	to 50,000	Watts
Carbon Arcs	100	to 50,000	Watts
Quartz Mercury Arcs	150	to 2,500	Watts
Infra-red Heaters	100	to 1,500	Watts

The sun's radiations vary. The power of the sun cannot be expressed in watts but the intensity of daylight at noon varies from 12,000 foot candles on bright summer days to 1,000 foot candles or less on dull winter days.

When the physician desires a source of radiation to accomplish one of the physiological effects produced by radiation he can therefore select a source that gives him a large proportion of the desired type of energy and get it in a size that will meet his requirements. The suitable type and size of apparatus is available, even though the requirements might vary from the case of one physician who requires a small lamp for applying a bactericidal radiation to the interior of a body orifice to the case of the hospital official who wishes to apply a light similar to sunlight to a group of sixty patients at a time in a large ward.

Discussion

Dr. Woodbury: I trust that what I shall say will not be taken amiss by the essayist, as I must speak from the physician's side of this subject.

We are indebted to the physicist for the basic explanation of our work in phototherapy. He has given us instruments of great precision to detect and measure radiant energy—such as spectroscopes, bolometers, thermopiles, etc. He has also described to us the nature of radiation, the method of its production and utilization, and its properties, and has designed for us lamps for its artificial production. He has further furnished us with spectograms and intensity charts and has composed filters for the modification of the radiation.

Let us interpolate here that no reputable manufacturer of phototherapeutic apparatus will refuse to furnish with his lamps such charts and spectograms as display the nature of the radiant energy emitted and the power of the emitting source.

To resume: We have not a pharmacopaeia for physical remedies and we have to depend upon the physicist for these facts and for certain hints as to what to do with them, but we cannot as physicians view the remedy from the same aspect as the physicist, and therefore we must use a different standard of evaluation.

The first fact which the physicist presents which we must not adopt—because it is highly misleading in phototherapeutics—is the arbitrary division of the electro-magnetic spectrum into ultraviolet, visible, and infra-red regions. This is looking at the matter from the old Newtonian point of view, where the retinal perceptivity or nonperceptivity is the important criterion.

It cannot be reiterated with too great emphasis that we do not treat patients with radiant energy depending upon its visibility. A blind physician can practice phototherapy upon blind patients, to whom visible and invisible rays have equal significance. Then, again, these areas have no exclusive physical or physiological virtues sharply delimited by the wave-lengths at the border lines of visibility.

Indeed, the physicist will tell us that any area of that portion of the spectrum used in phototherapy can be measured equally well in units of heat, electricity, or chemical change. It is time we realized that the shorter wave-lengths are preponderantly photo-chemical and electrical, the longer wave-lengths preponderantly thermal and electrical, and that the combinations of wave-lengths of these different extremes produce varying blends of the two physical effects, thus engendering wide variations in physiological reaction.

This matter of ultraviolet, visible, and infra-red has been played up by manufacturers to the extent that many have been misled into believing that one must have a special infra-red radiator, to give photo-thermal treatments, and a special ultraviolet radiator to give photo-chemical treatments.

For these reasons, this reiteration of the division of the spectrum into ultraviolet, visible, and infra-red portions is without significance to the photo-therapist. According to physicists, a substance will reflect, absorb, or transmit radiant energy depending upon its physical nature. When radiant energy is absorbed it is transformed into chemical energy or thermal energy, or electro-magnetic energy—which last is secondary radiation and which is in turn similarly absorbed and transformed, according to the nature of the substance.

Absorption of radiant energy is selective; that is to say, some wave-lengths of energy are harmonic with the frequencies of the molecular and atomic movements; other frequencies, not harmonic, are not absorbed.

The physiological reaction engendered in a tissue by radiant energy is first dependent upon the wave-lengths absorbed by its cells; second, the form of energy into which it is transformed; and, third, the reaction of the cell to that form of energy. The combined result of the local and systemic reactions depends upon the function of the organs affected.

No one can predetermine the physiological results of irradiation without all these factors being known.

Every substance, in living cells and body fluids, has an individual absorption spectrum, so-called, revealing the wave-lengths which it will absorb and utilize and those which will have no effect upon it. Our most conspicuous examples are hemoglobin in animals and chlorophyl in plants, for chemical transformation, and melanin for heat transformation.

The physiologists have told us that protoplasm absorbs radiant energy in the region called ultraviolet with increasing avidity as the wave-lengths decrease in size, and in the infra-red region as the wave-lengths increase in size, until we arrive at the extremes where the wave-length does not penetrate at all. We are also

told that protoplasm is transparent to the wave-lengths in the visible portion and extending beyond into the ultraviolet and infra-red.

As a result, those wave-lengths less than 313 millimicrons, which have the most irritant effect upon white-skinned subjects and which produce the most revulsive reflex activities, are all absorbed by the epidermis—the blister layer of the skin, and never reach the mucous layer of Malpighi in which lie the nerve endings, the pigment-forming cells, and the capillaries.

How an energy can act upon a layer of the skin which it does not reach has been calmly ignored by most writers and inadequately explained by others. To my mind, the reason is clearly found in the fact that the primary absorbed radiation is partly transformed into chemical energy and partly into secondary rays of longer wave-length which so penetrate and are absorbed by the deeper layers, thus producing the characteristic reaction which we ascribe to the Dorno region of the ultraviolet. Should the mucous layer of Malpighi be pigmented, the pigment absorbs this energy, thus shielding the deeper layers containing nerves and capillaries.

That we do have secondary radiation in abundance from ultraviolet primary radiation is proven by the fluorescence of skin and its appendages when viewed in the dark by fluoroscopy. Now fluorescence is merely visible secondary radiation. We have an ultraviolet and an infra-red secondary radiation also which are absorbed.

This matter of secondary radiation has not received the attention which its importance warrants.

I agree with Woodruff that the white man is a sport; that the natural state of mankind is to have a pigmented skin; but that, owing to a long sojourn in the gloomy forests and caves and the foggy atmosphere of the post-glacial era where little or no radiation less than 313 mμ reached him, man lost this protection to ultraviolet and became white-skinned. Consequently, all this talk about ultraviolet treatments and 1st, 2nd, 3rd and 4th degree inflammatory doses applies only to unpigmented white men. It would be entirely meaningless in Harlem, Africa or India. The logical thing to do is to dye or tan the skin so that the individual can then be exposed without danger of a sunburn to the beneficent therapeutic rays of the entire solar spectrum, natural or artificial.

The photo-chemical effects which take place in the epidermis, such as ergosterol activation, are in no wise diminished by pigmentation in a deeper layer, nor do they bear any relation whatever to inflammation of the corium.

The skin is a most important organ, and one of its most important functions is concerned with maintaining bodily temperature. A well pigmented skin not only absorbs primary caloric rays but it also emits secondary caloric rays in the red and infra-red region. The capillaries become distended by active hyperemia, a true erythema thus bringing a larger volume of blood to the surface where it can absorb photo-chemical and photo-thermal energy, and also lose heat by radiation and by evaporation. A sunburn, which is an inflammatory process, interferes with the heat-balancing function of the skin and produces a fever from heat retention.

We have been led astray by shibboleths, by the tagging of names to parts of the spectrum and slavishly repeating those names.

The antirachitic effect is only one of a wide range of biochemical effects which are not restriced to the ultraviolet region. Hill, Sonne, Sheard, and others, have shown that the identification of the word vital with the exclusive portion of the solar spectrum called the Dormo region is highly misleading because all portions of the solar spectrum have biological effects which are truly vital. Witness the absorption spectrum of hemoglobin, most pronounced in the luminous portion of the spectrum, which is usually considered of little or no importance by most writers on the subject.

The caloric rays are just as essential to life. I am not exactly certain as to my recollection but I have the impression that if the solar heat rays could be screened off from the earth it would be surrounded by a shell of ice many feet thick within a few hours. We can, however, live in health without any ultraviolet rays provided we get activated ergosterol in our diet. From this point of view the caloric rays are more vital than the chemical, if any comparison can be made.

The matter of photochemical dosage has been approached from the standpoint of the physicist. Thus various tintometers, ultraviolet meters, etc., have been devised to measure the radiation falling on the patient. This overlooks entirely the biologic factors, which consist of selective absorption and functional response to the energy received. Biological reaction is not always in proportion to the stimulus.

Inflammation of the skin, under the very erroneous title of erythema, has been popularly acclaimed as a criterion for dosage. An inflammation of the skin, however, is of therapeutic use only in skin diseases and varies with every individual white skin. It utterly fails as a standard in deeply pigmented skins and also as a standard for photothermal treatments with rays between λ 500 mμ and λ 1.4 μ. It has a totally different interpretation when, as photoallergy, it is due to photodynamic substances in the blood of the superficial capillaries when activated by radiation between λ 370 mμ and λ 500 mμ, which is in the range of the so-called cold ray region of the visible spectrum.

The terms biotic and abiotic have also been fastened to spectral areas with especial reference to inflammation from the ultraviolet chemical rays. When we recall that any of the areas of the solar spectrum can be made lethal if given in too intense an application this nomenclature fails to maintain sense.

It fails absolutely as a criterion for dosage of systemic complaints or tuberculosis, ulcer of the stomach and duodenum, osteomalacia, etc., where a sunburn would be disastrous.

Let no one think he can treat any and all diseases by a dermatitis from ultraviolet sources.

For these reasons, we are not desirous of raising up placards for special parts of the solar spectrum, but we desire that our patients shall absorb all of the spectral energy without a sunburn, except in a few isolated dermatological conditions.

The employment therefore of arc lamps with arc points which contain substances incandescing in the solar portion of the spectrum, is the ideal artificial substitute for solar rays.

DR. HERMAN GOODMAN: I am very happy that Dr. Dorcas has come before us and has told us so vividly of the physical characteristics of the principal sources of ultraviolet from the carbon arc as compared to sunshine. I am particularly pleased that he has brought before us a division of the infra-red. In this connection I wish to plead for your forgiveness for not having brought to your attention a division of infra-red slightly different from that of Dr. Dorcas. In brief, I divide the infra-red as follows: Diadermic infra-red, 6,000 to 14,000 A.u.; Endodermic infra-red, 14,000 to 25,000 A.u.; Epidermic infra-red, over 25,000 A.u.

My recent book, *The Physics and Physiology of Infra-red Radiation* (*Heat*), has a chapter on this division and the reasons therefor.

I am heartily in accord with Dr. Dorcas as to the need of a physical basis for physiologic effect. In this connection, I wish to state that I have visited the laboratory at Cleveland and have enjoyed visits with the physicists employed there. It has been my privilege to work with William T. Anderson, Jr., Ph. D., along lines similar to what is being done in Cleveland by Dr. Dorcas and his co-workers. Our results have not always been the same, probably because our base factors were not the same. This is not the place, nor have I the time, to smooth out our differences.

It is my understanding that you wish me to say something about the use of clinical sources of carbon arc radiation in dermatology. Early in 1925, I presented to this Society the lantern slides of a patient treated exclusively with radiation from a carbon arc lamp. Since that time, I have used carbon arc and flame lamps from 5 to 125 amperes. I have used carbons made available by manufacturers in this country, and some from both France and Germany.

As I relate in the second edition of my book, *Basis of Light in Therapy*, the common sources used in my practice were each studied in the physics laboratory under conditions used in my practice. This is very different from ideal physical conditions or purely laboratory studies of the same or similar arcs. In consequence of the physical measurements and their relationship to clinical practice, I have been enabled to choose the carbon arc conditions best suited for the case under consideration. In other words, I have used the apparatus somewhat as one uses the hypodermic syringe: I select what carbons to use as I select what medication is to go into the barrel of the syringe.

Moist lesions of the skin, non-healing wounds, whether intentional (postoperative) or non-intentional, and wounds with loss of substance (ulcers) do best with a source of radiation weak in erythema-producing ultraviolet. There is a carbon made in German and used under electrical conditions—seven amperes, 50 volts—with a right angle trim which is worthy of the name, 'non-burning' carbon. Its prototype is made in this country. I understand that it is cored with nickle. This source of radiation has been a valuable aid in moist lesions of the skin, non-healing wounds, and ulcers. Exposure may be prolonged, there is mild heat, and a restricted erythema ultraviolet output.

Infections of the skin, such as impetigo contagiosa, superficial pustulation in pustular acne, folliculitis from poor barber hygiene, and certain types of tinea of the non-hairy skin have been successfully treated by me using sources of ultraviolet of a different physical output. For these types of skin troubles, and for psoriasis and pityriasis rosea, I use carbons of the 'A' type at 20 amperes, 55 volts across the poles and 10 millimeters in diameter, cored with cerium earth, I understand. Exposures may be five to ten or even 20 minutes at 24 inches from the dual arc. The heat is relatively endurable. The white light is very intense and the patients must use goggles. The ultraviolet includes erythema zone ultraviolet, and patients who can tan, do so.

Ringworm of the toes may also be treated with this type of carbon arc radiation. The exposures must be prolonged, and the period of treatment must be extended beyond the time when

clinical cure seems assured. I will mention an interesting case. A male patient with a hammer toe was treated by me for tinea of the toes and contiguous portions of the soles of both feet. All the skin showed improvement except the areas under the hammer toe where the radiation did not reach. This area acted as a source of reinfection from time to time. Only after exercising much mechanical ingenuity to arrange for the exposure of the area under the hammer toe, and the repeated exposure of that region, was the patient given clinical relief.

The list of skin conditions can be extended to include: lichen planus; infectious eczematoid dermatitis; dermatitis venenata (rhus); herpes zoster; acne varioliformis; furunculosis; parapsoriasis; and some forms of essential or idiopathic pruritus.

You have noticed that I have not used the carbon arc or flame lamp to get an erythema. If erythema is indicated, and if the only lamp I had available was a carbon arc lamp of 20 amperes, I could get the erythema on the patient's skin by using the polymetallic carbons or the iron-cored carbons. However, with the mercury vapor arc in quartz lamps available in my office operating at four amperes, 75 volts across the poles, I find it cheaper to use them. I am not entering into the controversy as to the need for erythema in treatment of skin disease at this place.

I have on numerous occasions appeared before you to discuss the need for individuality, or specificity of clinical reactions to sources of ultraviolet. As time goes on, and as more physicists cooperate with physicians, we find that there is much in common between the laboratory and the clinical application in the office. One source of radiation of ultraviolet does not satisfy every need of every patient. A study of the physics of the source; a knowledge of the factors of distance and absorption; an understanding of the pigment indications and of tolerance help you in your practice.

The carbon arc and flame lamp offer you a choice of various emissions. The outline I have given you serves as a guide in dermatology. I find no reason to change from what I said here in 1925: 'It seems to me that the carbon arc light is a valuable instrument in dermatology, especially if the conditions treated are chosen from a knowledge of the pathology involved and an understanding of the physics'. (*American Journal of Physical Therapy, Dec.* 1925).

DR. DORCAS, closing: Replying to some of the questions: I agree with Dr. Woodbury that the use of the word light is not a good one from the physical standpoint in discussing the effect of radiation and I tried to show from my charts that "light" was simply an aid in explanation. Dr. Woodbury was a little disquieted because I did not discuss the chemical effects of radiation, such as have been discussed by Eidenow, etc. There are other physiological effects than those marked on the charts shown, some due to the visible radiation, some to the infra-red radiation; many of them are understood indefinitely; we do not know their limits; we simply know that probably light, or exposure to such light sources as we have, causes various effects, such as increasing growth or resistance to infection, as recently illustrated by Eidenow, but we do not know the exact limits, and the ones I put on the board were chiefly as the typical illustrations of how we can describe them rather than a complete list of all the known effects of radiation. I don't agree with Dr. Woodbury's explanation of secondary radiation being the kind that is responsible for the erythema. The phenomena of erythema can be explained on physical grounds by considering the absorption of the dead layers of skin, the secretions, and the chemical action of ultraviolet when it reaches the living skin cells. His suggestion of the use of the subdermatitis dose is perfectly sound from the physical standpoint, and many other physiological effects can be obtained without reddening of the skin; for instance, vitamin D can be formed in skin with much smaller doses than those which give the reddening of the skin.

Dr. Goodman's further division of infra-red into three divisions instead of two that I described—I am very glad to hear about. I have no doubt that in years to come there will be still further divisions. We cannot now set the limits to which we can go in determining the specific effect of the various kinds of radiation. He asked about the electrical conditions of the arcs which I described. They were various in the curves which I have given, but most of them were 30 amperes, 50 volts, A. C. We have studied arcs from three to two hundred and fifty amperes. Dr. Goodman asked if I did not think that some of the so-called reversal effects, like the appearance of vitamin D and its disappearance on further exposure, could not be considered as progressive chemical changes. They can, of course, but in all of these things you can go into very minute detail in describing the mechanism of changes. In many cases you get an apparent reversal of effect. It is, in the case of the photo-synthesis of vitamin D, a progressive change from the pro-vitamin to the vitamin D, and then a destruction of the vitamin to form a third substance.

Physical Therapy in Gastrointestinal Disease

Case Reports: A—Duodenal Ulcer. B—Duodenal Ulcer and Colitis. C—Diverticulitis and Colitis.

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Although medical literature shows an increasing number of articles on the value of physical therapy in disease of the gastrointestinal tract there still exists with many the impression that the good results obtained are entirely psychic. It might be said, in this connection, that this impression concerning physical therapy effects is usually gained by those who are not versed in physical therapy or who have had very little experience personally with physical therapy, and hence their opinion cannot be considered as positive or conclusive evidence against its use. Even as well known a man as Barker dismisses the question of physical therapy with a brief statement. In an article in a recent number of the *American Journal of the Medical Sciences,* entitled, "On the Management of the Spastic Colon and Mucous Colopathy," he states that "Electrotherapy though much vaunted is not indispensable; its effects are chiefly due to suggestion."

On the other hand, in a personal letter received about two years ago from Alvarez of the Mayo Clinic regarding a paper on physical therapy in mucous colitis, he wrote to me: "I like the article on mucous colitis, and think it sane because it fits in well with my own experience."

So here you have two divergent opinions on the effects of physical therapy in colitis. One, the opinion of a renowned internist, and the other, the views of an outstanding gastroenterologist, equally renowned, one who has had an extensive personal and actual experience in treating gastrointestinal disease.

My main purpose from the beginning of my work several years ago, using physical therapy in gastrointestinal disorders, has been to emphasize one idea. I cannot state it too strongly nor impress it too deeply—and I feel that it should have some value as it represents an opinion based on an intensive study of thousands of cases of gastrointestinal diseases treated with and without physical therapy. It is this. Irrespective of whatever good results one can obtain by the usual means such as diet, medication and rest in the treatment of gastrointestinal disease, much better results can be obtained and recurrences are less frequent when to these measures is added physical therapy.

As an illustration of this, I present three different cases—chronic and resisting other forms of treatment.

The first case is an uncomplicated duodenal ulcer. This patient, S. G., male, age 65, chauffeur, had for five years been suffering with very sharp epigastric pains. The pains were localized and were worse two hours after meals. These pains would last for hours or could be relieved by the use of sodium bicarbonate, recurring soon after. There was marked belching and bloating, the bloating being relieved by belching. Occasional heartburn but no sour taste. There has been no nausea

and vomiting except once, the vomitus consisting of sour fluid containing mucus. He had been awakened early in the morning with pain. Appetite was poor and he slept poorly on account of the pain. The weight lately had increased a few pounds. The bowels had been costive and there was an occasional burning urination. The past history was negative.

Examination showed a well nourished male, with an anxious facies—the so-called dyspeptic look. The heart and lungs were negative. Urine was negative. Blood pressure: sytolic, 130; diastolic, 70. A test meal showed a free acid of 50 and a total acid of 80. Palpation revealed a considerable degree of tenderness in the epigastrium. X-ray showed a definite ulceration of the duodenum. He was given a bland diet and antacid medication, and advised to continue with his work. Besides this, he was given tri-weekly treatments with infra-red radiation followed front and back with ultraviolet radiation from a mercury vapor in quartz lamp. The symptoms disappeared entirely very early in the treatment and have not returned. Inasmuch as he had had the usual ulcer therapy without physical therapy without results, at one of our best institutions, it is reasonable to assume that physical therapy has played an important part in the relief of symptoms and improvement of the condition.

The second case, duodenal ulcer with colitis: G. L., male, age 66, garage owner. There was a two-year history of epigastric pain and pains low down in the abdomen. The epigastric pains were of a sticking character and bore no relationship to meals. The pains in the lower left abdomen were very sharp at times and lately had been worse than ever. For isx months he had had had a bronchial cough and this tended to aggravate the pains. There was no belching nor bloating. No nausea nor vomiting. Sour taste was present, but no heartburn. The appetite was poor, and he had lost 16 pounds in nine months. The bowels were costive and there were no urinary disturbances. His sleep depended on his cough.

He gave a history of malaria at 26, a Neisserian infection as a boy. Six years ago, he had had a severe attack of epigastric pain and was ill from seven to eight months.

He was X-rayed at the Cornell clinic during September, 1928, and a diagnosis made of duodenal ulcer with possible adhesions about the sigmoid.

On examination he was found to be somewhat emaciated. The chest examination revealed dry, sibilant râles limited to the bronchial region. The heart was negative; blood pressure: systolic, 90; diastolic, 50. The urine was negative. There was marked tenderness in the duodenal region, and over the cecum and descending colon. X-ray showed a persistent duodenal incisura and dilation of the cecum and ascending colon, also colitis of the transverse colon and descending colon. The appendix was visualized.

He was given a bland diet, antacid medication and placed on physical therapy consisting of infra-red radiation and ultraviolet radiation from a mercury vapor in quartz lamp. His response to treatment at first was slow. The epigastric pains disappeared and he has had only occasional, very slight pains in the left lower abdomen. The cough disappeared early in the treatment, and in every way, especially in appearance and strength, there has been a marked improvement.

The next case, one of possible diverticulitis wtih colitis, is of unusual interest, because not only of its persistent recurrence, but because of the regularity of its recurrence. Although it is possible to show diverticula of the colon, it is impossible to visualize on the X-ray film inflammation of these diverticula. The diagnosis must be assumed when in the presence of these diverticula there is marked pain in their region, especially when associated with temperature. The picture of colitis, however, can be demonstrated. This patient, H. S., male, age 38, broker, consulted me early in April, 1928. He stated that his attack began in December, 1924, with very sharp pain in the left lower abdomen. At that time he was very sick. The temperature had been 102 and he had been in bed from five to six days. Although, as a rule, his bowels had been regular, with the attack he was very constipated. There was a feeling as if his bowels were tied in a knot, as if nothing would come through. Laxatives were used without avail. Enemas gave some relief. There had been no nausea, vomiting, sour taste nor heartburn. The next attack occurred in 1927. It was similar to the first attack. There was also temperature, the attack lasting three days. Since then, he had had six more attacks, always with very sharp pains, and temperature as high as 102, necessitating his going to bed. The attacks lasted from three to four days. In the three months preceeding his visit to me, he had had four attacks, occurring practically once every three weeks. The present attack had been going on for two days; the temperature was 102 degrees. The pains were very sharp over the lower left abdomen and seemed to radiate to the mid-line. The bowels were costive. No other symptoms were present.

Examination showed a well nourished man. On palpation over the descending colon and sigmoid regions there was an unusual degree of tenderness. An X-ray series showed a colitis of the descending colon and a diverticulosis involving the descending colon and sigmoid. Films taken daily for ten days showed a persistence of the barium in some of the diverticula. The patient was placed on a bland diet and medication and given physical therapy consisting of the usual infra-red and ultraviolet radiation. Relief was immediate and he has had no recurrence in almost eight months. He states that he has not felt so well in years. The question of future attacks remains to be seen, but inasmuch as this is the longest period in two years that he has been free from attacks, it is reasonable to assume that the physical therapy used here has had something to do with the improvement of the condition and the prevention of any recurrence for at least eight months.

The technique for the use of physical therapy in these cases is the following:

The patients are first given a 20-minute exposure anteriorly to the infra-red lamp. This is followed by increasing exposures front and back of ultraviolet radiations from a mercury vapor in quartz lamp. Three treatments a week are given, there being a minimum of thirty treatments.

1160 Park Avenue.

Discussion

Question: I would appreciate it, reasoning from the physical and biological aspects of these cases, if Dr. Levy would tell us how these results were obtained.

Dr. E. L. Hergert: I am connected with a rectal clinic in Brooklyn, and, with due respect for Dr. Levy's diagnosis, I would say that we do not rely on X-rays there for the diagnosis of ulcerative colitis; we use the proctoscope and the sigmoidoscope, and we can make the diagnosis of mucous colitis without any X-rays. We can see the formation of the ulcers, the blood, the dry and granular mucous membrane, the vessels, and the atrophic condition of the colon with our eyes; and it seems to me that the sigmoidoscope is a better way of making such a diagnosis than the X-rays. In our clinic we never send any patients for X-ray examination for ulcerative colitis. I did not hear the Doctor say anything about using the sigmoidoscope.

Dr. C. R. Brooke: In submitting case reports we always aim to be as specific as possible as to the technique of the various modalities—time, duration and frequency of treatments, etc., and I hope that Dr. Levy will be a little more specific about the technique of his ultraviolet ray exposure in the cases presented.

DR. LEVY: Replying first to the question of the use of the sigmoidoscope in diagnosing ulcerative colitis. I agree that it is important in cases of ulcerative colitis. The barium enema will also give information in those cases. Jordan of Boston uses the barium enema for diagnosing colitis. I do not care so much for it as it does not bring out the fine details which are best seen with the barium meal. In ulcerative colitis, ultra-violet gives only a temporary effect. I have never found anyone who has obtained permanent results with it.

The technique is these cases is the same as in other conditions. I use first the infra-red with a two-foot reflector and direct it over the abdomen as close as the patient can tolerate it. Some cases can stand it 4 to 6 inches away and others a foot or more away.

I have spoken about the rationale of the treatment so often before other meetings that I do not mind repeating it again. The exact action of infra-red has been unknown but one set of experiments gives us a hint. Davis and Weiss at the Boston City Hospital have shown that if novocaine is injected into the peripheral nerve endings in the skin in the Head zones corresponding to the organs supposed to cause the pain, that attacks of pain can be prevented. We know that the abdominal organs have no nerves of pain, therefore whatever pain is aroused by them must be due to stimuli reaching the peripheral nerve endings, by way of the spinal cord and to the skin. Infra-red acts on the peripheral nerve endings, being absorbed by the skin. I also think that just as stimuli are sent from the organs to the peripheral nerve endings in the skin, these same nerve endings may also take up stimuli and send them back to the organs with which they are associated, in this way exerting a beneficial effect. Some day I hope to see this proven.

The Treatment of Varicose Veins by the Injection of Sclerosing Solutions

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Few innovations in surgery have met with such deserved universal approval and success as the injection method of treating varicose veins. Within the past few years, the histopathology of chemically-induced venous occlusion has received considerable study and the technic of intravenous injections has been simplified, indeed perfected. Therefore, many surgeons have adopted this mode of treatment and have reported their results. They are almost unanimous in calling attention to its great advantages, in suitable cases, over other operative or non-operative methods.

Varicose veins of the leg, of the thigh or of both thigh and leg, and the eczema and ulcerations so frequently associated with and usually arising from them, are often painful, disfiguring, disabling and potentially dangerous. They are a source of economic disability to those whose vocation necessitates the standing posture for lengthy periods. Besides, in the case of women, the present fashion of wearing short skirts and transparent stockings with the resulting exposure of the silk covered leg is a matter of very great moment and distress when such varicosities are present.

There is no accepted etiology for varicose veins. The most probable causes appear to be venous dystrophy (1); venous hypoplasia, heavy continuous work in the standing position, hereditary defect or acquired incompetence of the valves of the veins (2); abdominal constant pressure of any kind along the course of the big veins, in the abdomen, pelvis or leg, frequently determines varicose veins. The stagnation or even reversal of the circulation present in varicose veins has been referred to by many writers (3). Sicard and Gally proved radiographically, (by means of lipiodol in the veins) that the blood-flow in varicose veins is reversed. Melkon (3½) X-rayed his patients and noted that, in both the sitting and standing posture, the solution deposited in varicose veins flowed toward the periphery.

In the vast majority of cases, even when ulcers are present, it is the superficial veins that are dilated, tortuous, thickened, sacculated, in a word, that are varicosed. The deep veins, owing to the strong muscular and fascial support which they enjoy are rarely, in the absence of a previous infectious thrombo-phlebitis, the seat of varicosities. Many patients with varicose veins have contented themselves with palliative measures, such as the use of elastic stockings, rather than to submit to resection or excision of the dilated vein or veins or to any of the many other operative measures devised for the cure of varicose veins of the leg and thigh. Many patients who refuse operations can easily be persuaded to consent to the injection treatment, thus saving themselves the disability, the discomfort and the dangers incident to untreated varicose veins.

The immediate effects of operative treatment of varicosities of either the leg, the thigh, or both, are usually good. The remote effects, however, often are far from satisfactory. Others, as well as I, have found that owing to the abundance of the collateral cutaneous and subcutaneous venous circulation and also the persistence of the etiological factors, the condition frequently recurs, and often with as great intensity as prior to the operation. Recurrences are due to the dilatation of some tributaries of the saphenae, magna or parva or both, which previous to the operation were apparently normal. Canalization of occluded or ligated veins is a very unusual occurrence.

McPheeters (3), who collected data on 6771 operated cases, found 19.2 percent of recurrences after 5 years, a figure which I think is much below the general average, especially when the deep veins are involved. In this series of collected cases, there were 35 post-operative deaths from pulmonary embolism, 37 cases of non-fatal pulmonary embolism, and 28 deaths from other causes. The results of operative treatment of varicose veins are, therefore, at times disappointing both to the surgeon and to the patient, especially to the latter, who is subjected to the incapacity and expense of hospitalization. There has been a diligent search for a less unsatisfactory method of dealing with this condition and it is my belief that the injection method of obliterating varicose veins is the best solution as yet found. No treatment has been devised which absolutely protects the patient from recurrence; all methods have failures.

The Injection Treatment of Varicose Veins

Although a satisfactory method of obliterating varicose veins by the intravenous injection of sclerosing substances is of comparatively recent date, yet attempts to do so date back to 1851, when Pravaz tried to obliterate an aneurism by injecting it. Chassaignac, in 1853, suggested the injection of perchloride of iron into varicose veins. Desgranges (4), in 1854, used an iodotannic solution for the purpose. Various other methods were used but with little success until Tavel (2), of Berne, recommended in 1904 the injection of 5 percent phenol.

In 1908, Schiassi (3) reported the results of his combination treatment of surgery with the injection of Lugol's solution, to the Italian Surgical Congress. He claimed to have obtained very satisfactory results.

In 1911, Linser (5), of the Tubingen Clinic, Germany, reported that the continued intravenous use of mercuric chloride in the treatment of syphilis obliterated the injected veins and that he had used this knowledge in the treatment of varicose veins. Later on, in 1925, Linser changed from mercuric chloride (on account of its great toxicity) to sodium chloride solution. The toxicity of the mercurial salts unfits them for general use as obliterating agents of varicose veins.

In 1920, Sicard of Paris introduced the use of sodium carbonate; this solution proved too caustic. The following year, he with Paraf (4) reported much better results with sodium salicylate. The clinical reports of Sicard, Paraf and Lermoyez (4), in 1922, fully established the modern method of treating varicose veins by injections of sodium salicylate as rapidly sclerosing and practically painless.

Besides the sclerosing solutions mentioned many others have been used. Sicard and Gaugier (1) mention quinine hydrochloride and urethane as used by Génévrier Grangier advises that the mercurial salts of quinine preparations be used only in cases that resist the action of sodium salicylate. Sugar in the form of calarose or invertose has been used by Ludwig and Nobl (7). Alcohol, dextrose and glucose have also been employed. There is not, as yet, any solution alone which can be considered entirely adequate for every purpose.

The Mode of Action of the Sclerosing Solutions

The earlier advocates of the injection method sought a rapid coagulation of the blood—a coagulation thrombosis. Later, however, the view was reached that the desired mode of action was the production of a localized, limited and chemical thrombo-phlebitis. This thrombo-phlebitis, chemical in nature, results from inflammation and injury of the intima leading to agglutination of the vessel walls and obliteration of the vessel lumen. Such an effect is produced either by a sodium chloride, a sodium salicylate or a sugar solution of a proper percentage. Following the injection of these sclerosing substances into varicose veins, microscopic examination of removed vein segments shows a swelling, an inflammation and a destruction of the intima, all due to chemical irritation. The formation of a chemically produced local thrombus adherent to the vessel wall results from the deposit of fibrin and broken down blood cells. The thrombus becomes hyalinized and organized within a few weeks and ultimately a fibrous cord is all there is left of the vein. The whole process depends upon the original effectiveness of the sclerosing solution in producing a sufficient irritation and inflammation of the intima. There is no coagulation of the blood in the vein. The mechanism, as outlined by Regard (6), is first an edema and destruction of the vessel wall endothelium with detachment of endothelial cells and a fibrinous deposit on the inner surface, followed by the formation of a fibrinous blood-clot which in time fills the lumen of the vessel and obliterates it; the injected vessel segment is destroyed by organization of the chemically produced thrombus and ultimately becomes a fibrous cord.

Advantages of the Injection Method

Compared with the operative methods in vogue, the injection method of treating varicose veins possesses certain admitted advantages.

First, the patient is spared the mutilation of a surgical operation as well as the greater expense and loss of time. Surgical anesthesia, local or general, is not required, is needless. Incisions not being required, there remain no disfiguring scars. No hospitalization is necessary; and the treatment being ambulatory the patient is not incapacitated and can continue his or her occupation. The sclerosis of the vein is effected without any associated pain or troublesome edema, and does not entail any motor, trophic or febrile disturbances.

Second, with the injection method, there is a greater certainty of cure. As already mentioned, recurrences after a few years are not uncommon after operative treatment. Should they occur after injection, further injections will cure them. Sicard and Paraf (9) in a very large series of injections saw just a few recurrences. Alexander (14) in 100 cases saw none.

Finally, with injection, there is less danger of complications. In regard to mortality, McPheeters and Rice (8) state that in 53,000 cases of injection-treatment reported in the literature there were only 7 deaths. Some of these occurred in the early period when the technic had not been established and when it was thought necessary to use strongly coagulating injecting substances. At the present time, the mortality from the injection treatment is practically nil. The mortality from operative treatment even in the best clinics is not less than 1 percent. It might be thought that pulmonary embolism would frequently occur from the injection method. But it does not. Only 4 cases of pulmonary embolus are found in the literature (only 2 of which occurred with correct technic), whereas the mortality from embolus following surgical operations for varicose veins is stated to be 0.7 percent. With the present-day improved technic of injection and with due precautions, the possibility of pulmonary embolus is practically eliminated. Sicard and Gaugier, who in 1928 reported upon 325,000 injections, observed no occurrence of pulmonary infarction. Irrespective of the solution used, it is well to avoid overdosage.

Indications and Contra-indications for Injection

Superficial varicose veins of the leg, associated or not with eczema, ulcer or other complications, can, and should, in the absence of contra-indications be treated by the injection method.

Operative treatment should be reserved for cases that fail to yield to the injection treatment. Neither the extent of varicosity nor the age of the patient exclude the use of the method.

The method is contra-indicated when there is a deep or superficial phlebitis present or until it is quite certain that all effects of a preceding phlebitis have fully cleared up; also, when the venous dilatations are clearly the result of cardiorenal disease with venous stasis; or when they are part of the syndrome of Buerger's or Raynaud's disease.

The injection method is also positively interdicted when the varicosities are compensatory in nature, secondary to occlusion, partial or complete, of the deep veins. Superficial varicose veins, when secondary to thrombosis or thrombo-phlebitis of the deep veins, perform the rôle of a collateral circulation and must be respected. To occlude them would invite edema and gangrene of the leg. It should not be used if gangrene is impending or existing.

In the presence of pregnancy, in the presence of large intrapelvic or abdominal tumors, in a patient with marked hypertension, other and preferable existing remedial measures are indicated. Varicose veins developing with the appearance of the menses, during the course of pregnancy, and with the evolution of the menopause often yield to ovarian therapy, supplemented by the administration of hamamelis, hydrastis, etc. Varicose veins occurring in the course of pregnancy unless

very troublesome had better not be injected. During gestation, the condition is often transitory and may be due to an endocrine disturbance.

If the superficial veins alone be involved, injection with or without ligation of the saphenous vein near the foramen ovale gives uniformly good results.

Kern and Angle (9) remark that there is no absolute test for determining obstruction of the deeper veins and they depend more on the patient's history of a post-operative or post-partum phlegmasia alba dolens than on the Trendelenburg test. If there be doubt, it is better not to inject.

Technic of Injections

No matter what sclerosing substance is used, the technic of making the injection is about the same. A 5 or 10 cc. all glass, eccentric tip Luer syringe and a 24 or 25 gauge needle with a short bevel are generally used. The same preliminary precautions in regard to sterilization of instruments and to selecting and cleansing the site of injection should be observed as in all intravenous injections.

The injection may be made with the patient in the standing, sitting or lying position, the sitting being favored by many practitioners. Sicard and his associates favor the recumbent position; they state that the recumbent position enables the sclerosing fluid to act more rapidly on the intima. In my own practice, I have generally followed this procedure, but sometimes it is a little more difficult to enter the vein. McPheeters also prefers the horizontal position, but first places, while the patient is standing, a tourniquet above the site of injection, releasing it as soon as the varix is entered.

It is by no means easy to insert the needle properly in dealing with a tortuous mass of dilated veins with thin walls, such as occur in varicosities, and this is a matter of technic which the physician or surgeon who wishes to employ this method must thoroughly master. No one should lightly undertake to inject varicose veins unless he is quite competent and familiar with the technic of intravenous injections, because, even to the surgeon who is accustomed to the method, it is often difficult to deal with old-standing varicosed masses. Care must be taken not to transfix the vein or push the needle through the farther wall. When blood flows into the syringe and the surgeon is satisfied that the needle is within the lumen of the vessel, the thumb and middle finger of the left hand expresses the blood by a stroking movement from the section of vein for two or three inches proximal and distal to the needle insertion. When this section is emptied, the fingers are not removed but the pressure is kept applied until the injection is completed. The injection should be slow, about 1 cc. in 15 seconds and not more than 5 or 10 cc. of solution (according to the solution used and the circumstances) should be injected at one time. When the injection is completed, the index finger of the right hand is pressed over the point of injection, then the needle is pulled out quickly, the pressing finger preventing any escape of fluid. The other fingers of the same hand are kept pressed upon the vein for from three to five minutes to prevent the flow of blood while the sclerosing injection is working. Finally, a piece of adhesive tape or collodion is placed on the point of injection and a cotton pad protected by a 4-inch Ace bandage is placed over the site. Kern and Angle (9) apply a firm pressure bandage taking in the entire leg and foot. This bandage is worn during the treatment and for some weeks following.

Most operators prefer to place an Esmarch bandage or tourniquet above the knee when injecting veins below the knee. This is done especially for the purpose of making the veins prominent. Stoner and others prefer not to employ a tourniquet. We never have found it necessary to employ a tourniquet. This is a matter for the surgeon's judgment. Kern and Angle (9) have not hesitated to inject varicosities in the upper third of the thigh and have caused thrombosis within 2 inches of the fossa ovalis. Most workers consider ligation of the saphenous vein entirely unnecessary. Bratrud in dealing with high varicosities after ligating above the point of injection opens the vein in the middle or lower third of the thigh and injects 20 cc. of sclerosing fluid after first emptying the vein. Kern and Angle feel that if the saphenous vein is dilated and tortuous above the knee, the entire affected venous tree must be obliterated or else there will be a recurrence of varices in the leg.

More than one vein may be injected at the same sitting or different sections of the same vein. The smallest vein should be injected first and the largest last, and in any case the most distal part of the vein should be first injected. Not more than 10 cc. of solution should be injected at one time in any spot. The injections are repeated twice weekly until all evident varicosities are injected. The treatment is ambulatory. Some severe cases may require as many as 20 injections. When the sclerogenic fluid instead of being injected intravenously has been deposited in perivascular tissues, inject into the field some ordinary physiologic salt solution. This will terminate the destructive action of the escharotic and thereby preserve the viability of the tissues.

Reactions and Complications

The immediate effects of the injection are vasomotor, hence the pallor, the goose-flesh appearance and the temporary cramps that follow the injection. Some edema and tenderness usually persist for a couple of days or so along the site of injection but call for no special treatment. In an occasional case, the intima inflammation or the cellulitis may extend even to the sapheno-femoral opening but as this is a chemical and not a bacterial inflammation, the venitis is localized, limited and no uneasiness need be felt. Moist, warm compresses usually dispose of it. Superficial ulceration or sloughing may occur in a small percentage of cases, due either to lack of asepsis, or to faulty technic: penetrating the whole vein, depositing the escharotic fluid in the perivenous cellular tissues, leakage around the puncture, etc. When it occurs, healing may be very tedious but a serious result is very rare, though an ugly scar may be the ultimate sequel.

A recurrence may appear owing to insufficient obliteration and should be dealt with by a fresh injection. Kern and Angle observed only one recurrence in 651 injections.

Louste and Levy-Franckel (10) have reported a case in which a linear band of hypertrichosis formed over the venous trajectory following a sclerosing obliteration of a varicose vein. Consecutive pigmentation of the area has been reported by some others but no other case like the former appears to have been reported. The danger of embolism (it has occurred so rarely) can be disregarded; that of toxic effects can be eliminated by the use of relatively harmless solutions.

Comparison of the Sclerosing Solutions

Clinically, sclerosis may be obtained with any of the solutions ordinarily used. The sclerosing effect of 20 to 30 per cent of sodium chloride is perhaps better than that of any other solution. Stronger solutions are likely to be followed by intense cramps in the limb; even from weak solutions, if deposited outside the vein, paraphlebitis with or without sloughing may result.

With sodium salicylate, used alone, systemic reactions may occur although they are not pronounced. Otherwise, the effects are much the same as with weak sodium

chloride. In my own series of cases (about three hundred) I have almost always used sodium salicylate in 20, 30 or 40 per cent solutions. I have never observed any serious reactions, although some cramping and pain in the limb for some minutes following the injection of 10 cc. were frequently observed. I now rarely inject more than 5 cc. at any one point at any one time. After the patient had rested for about ½ hour with the leg in an elevated position, all symptoms subsided and disappeared. These cramps are always of short duration and are without danger. With dextrose solution, up to about 50 per cent strength, there is practically no cramping nor perivenitis if deposited outside the vein but the sclerosing effect is less than with the sodium salts. McPheeters gives first place as a sclerosing and safe agent to calarose, a solution containing 75 per cent invert sugar and 5 per cent cane sugar.

Génévrier's solution—quinine and urethane—is given second choice by McPheeters, who states that it causes no cramps whatever at the time of injection. In the presence of pregnancy, or renal disease, quinine preparations should not be used.

Probably, the best sclerosing and most generally satisfactory solution when injected into the vein, is one containing 40 percent sodium salicylate; I have found nothing to equal the sodium salicylate solution for sclerosis, though I must acknowledge that it is very caustic to extra-vascular cellular tissue. In a few cases resistant to sodium salicylate and also in a few cases of very voluminous veins, I have used, at times, mercuric iodide and, at times, quinine preparations. Kern and Angle consider that a mixture of 50 percent dextrose and 30 per cent sodium chloride is an ideal solution.

Clinical Results of the Injection Treatment of Varicose Veins

As already mentioned, McPheeters states that in 53,000 cases of injection treatment of varicosities reported in the literature, the operative mortality was only 0.0024 per cent. Meisen (11) has reported a series of more than 2000 cases without a fatality and there was only 1.6 per cent of any kind of complication following the method using sodium chloride.

McPheeters' opinion based on his personal experience of 348 cases of varicose veins and ulcers is that the injection method is far better than the surgical procedures and that varicose ulcers can be healed and kept healed by it.

Schussler (12), following his experience of a large series of treatments, states that he knows of no therapeutic measure that gives greater satisfaction to both physician and patient.

Kern and Angle, quite recently reporting the result of their experience of 154 patients treated by the injection method, say that they are convinced that this is the method of choice.

Recent literature contains a number of reports of smaller series of cases and the general opinions expressed are similar to the foregoing, and prove that the fears of pulmonary embolism, sloughing of the tissues from perivenous injection, and toxic effects of solutions used, which have delayed or prevented some surgeons from adopting the method, are negligible or can be avoided.

My own experience comprises about 300 patients treated for varicosities, 40 of whom had varicose ulcers, and a much larger number an eczematous condition of the skin. Sodium salicylate in 20, 30 and 40 per cent solution was almost always the sclerosing agent employed. There was no fatality in this series nor any case of pulmonary embolism. Temporary cramping, pain, and edema were observed followed the injections in a large number of the patients but in only a few were these of such moment as to prevent the patients from following their occupations. Superficial sloughs occurred in 15 cases. All were due to faulty technic in injecting. In 4 of these, the recovery though painles swas very tedious. In none of these did I have to open up the sloughing area and excise necrotic tissue.

A recurrence in the area treated was observed after the lapse of several months in 12 cases. They were treated with further injections and a good ultimate result was obtained. About a hundred of these patients have been followed for 3 years and as yet show no signs of recurrence. The contrast with similar cases previously treated by excision of the dilated packets of veins has been very striking and I feel quite enthusiastic in regard to the great value of the injection method, when it is applicable. I feel that in the future it will supersede in the vast majority of cases all the other now existing methods.

Its main advantages are that it is an ambulatory method, that it is inexpensive, painless, simple, efficient, safe and almost innocuous. By obliterating the varicose veins, we relieve in part or wholly the symptoms commonly associated with them, such as eczema, varicose ulcers, cold feet, heaviness of the limbs and the arthritic pains about the knees.

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The Acid-Base Equilibrium of the Blood in Acute Rheumatism.

The theory of the infective origin of rheumatism, now commonly accepted, raises the question whether the casual organism may be one that produces an acid toxin. In order to obtain evidence for or against this hypothesis, L. G. Parsons and S. H. Edgar (*Arch. Dis. Child*, p. 291, October 1929) have investigated the acid-base balance of the blood in rheumatism. Normally the pH of the blood is extremely constant, but certain pathological conditions can induce an acidosis or an alkalosis. Usually, however, any change tending to occur is speedily regulated by alterations in the excretory systems, which neutralize the disturbing effect and keep the pH constant. This is not always so, and should a point be reached where the regulating mechanism is unable to cope with the disturbing factor—as, for example, in diabetes, where the production of non-volatile acids is continuous—the pH will be altered and an abnormal figure obtained. To ascertain the acid-base balance, or equilibrium, of the blood two estimations are necessary—namely, of the pH and the carbon dioxide content. These tests were applied to the blood of 53 children, all of whom had received institutional treatment for a period of one to two years or even longer. The results showed that the acid-base equilibrium of children suffering from acute rheumatism, whether in the acute, convalescent, or quiescent stages of the disease, was normal. The authors conclude that there is thus no evidence in favour of the view that the symptoms of rheumatism are due to an excess of acid in the tissues, or that the rheumatic child is an "acid" child. As regards other factors, Edgar has investigated the variability in blood calcium in rheumatism, and his results support this conclusion.—*Brit. M. J.* 1: Ep. 6, Jan. 4, 1930.

Digitalis Medication

When administering a liquid preparation of digitalis it is necessary to regulate the dosage by a minim graduate rather than a dropper.

Medical Times

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NEW YORK, MAY, 1930

Standards and Principles

A medical journal should reflect the highest standards and principles of the profession itself. There are many criteria by which a journal's success in maintaining an ethical policy may be judged, just as there are many by which its scientific standing may be gauged. Among the former, perhaps the one furnishing the best evidence as to a journal's claim to be worthy of the profession's confidence is that which has to do with the manner in which drugs are discussed in the scientific section of the publication.

The MEDICAL TIMES, expecting to receive the moral support of all reputable physicians, will hereafter inscribe upon its cover and editorial pages, in every issue, the following conditions governing the publication of articles submitted to it, in so far as drugs that may happen to be mentioned in them are concerned.

The MEDICAL TIMES will not publish any articles which contain references to drugs, synthetic or otherwise, except under the following conditions: 1. The chemical and not the trade name must be used; 2. The substance must possess the approval of the Council on Pharmacy and Chemistry of the American Medical Association; 3. The paper must have been read and discussed before a recognized medical society; 4. Documentary evidence of conditions two and three must accompany the manuscript.

Certified Milk and the Brucella Controversy

In the February issue of *Good Housekeeping* Dr. Frederic Damrau, of Brooklyn, published an article on undulant fever in which he took a conservative position regarding the alleged menace of certified milk. For this he has been severely arraigned by the *Journal of the American Association* (April 19 issue). And yet hysteria on the subject is deplored by other authorities, as exemplified in a recent *Bulletin* of the Medical Society of the County of Kings (Brooklyn).

One can hardly escape the conclusion that the *Journal of the American Medical Association* would like to see the marketing of certified milk stopped. It must be a considerable industry. We wonder if the alarm and panic are justified. As a whole, the argument in the editorial seems a bit far-fetched and leaves us cold. It should be considerably discounted. Certainly no industry should be wrecked upon the strength of it.

We are taking the good faith of the Chicago editorial for granted and assuming that it was not "inspired" by any certified-milk faction dissatisfied with the economic yield of the industry and actually interested in scrapping it.

We have not, of course, been oblivious to the possible significance of the propaganda of one of the dried milk subsidiaries, emphasizing the safety of its product as against what it discreetly calls "liquid" milk.

The article by Dr. Thewlis in this issue of the MEDICAL TIMES gains added interest by reason of the *Brucella* issue, now rapidly maturing and in a fair way to be rationalized.

Peptic Ulcer of the Esophagus

Chevalier Jackson, (*J. A. M. A.* 92:369, Feb. 2, 1929), pointed out that every patient who complained of discomfort or abnormality in swallowing, pain back of the sternum, gastric hematemesis, regurgitation, and "heartburn," should be examined esophagoscopically to determine the presence or absence of peptic ulcer of the esophagus. Dr. Jackson reported eighty-eight cases and concluded that focal infection was the chief etiologic factor, with the tonsil the most frequent site of the focus. The most characteristic symptom was retrosternal pain or discomfort extending through to the back. Chronic esophagitis may have the same symptomatology while ulcer may be painless.

Clerf (*Archives of Otolaryngology*, 11:344, March, 1930), states that esophagoscopy is indicated in every patient complaining of the slightest abnormality in swallowing or the slightest degree of retrosternal pain. Other symptoms are dysphagia, vomiting, hemorrhage and perforation. Clerf believes that it is very difficult to arrive at a diagnosis. For treatment he suggests removal of foci of infection, rest, regulation of diet and administration of olive oil, alkalis, and belladonna, and sometimes he applies nitrate of silver through the esophagoscope. At times Clerf performs gastrostomy to insure adequate feeding.

Without doubt many small ulcers of the esophagus cause symptoms of ordinary indigestion and perhaps heal under ordinary dietetic management.

One might wonder if syphilis ever plays a part in the causation of some of these ulcerations. Retrosternal pain or pain at the tip of the sternum is sometimes caused by syphilis. At the present moment the writer is treating a patient who has all the symptoms of ulceration of the esophagus, including retrosternal pain, distress after eating, and loss of weight. Sixteen years ago he was under my care for syphilis; three weeks after

the discovery of the primary lesion he had syphilitic nephritis. Later he neglected treatment and now is complaining of esophageal symptoms. He is greatly improved after the second injection of neoarsphenamin. Tertiary syphilis often causes retrosternal pain and I have seen several cases similar to the one just described.

Another possibility of pain in the region of the sternum, somewhat similar to that caused by ulceration of the esophagus, is the over-use of tobacco. Excessive smoking and chewing cause indefinite pains in the chest and sometimes in the region of the esophagus. The symptoms usually clear up about three weeks after discontinuing the use of tobacco.

The esophagoscope will clear the diagnosis but it should not be forgotten that syphilis may be in the background and this should be checked up by blood examination. Furthermore, in many instances, senile patients who have had syphilis many years before may not show a positive blood test, yet syphilis may be the causative factor. In these cases, roentgenographic examination of the long bones may help; similar examination of the stomach often reveals the characteristic condition.

—M. W. T.

Lump in the Breast

A woman, aged 42, consulted the writer for severe pains in both breasts. The pain was very severe at night and she was unable to sleep. Systolic blood pressure was 160. Examination of the breasts showed several lumps in both breasts which were tender. X-ray examination of the teeth revealed five badly abscessed roots and these were removed. The pain in the breasts subsided in a week and in a month the lumps disappeared. The blood pressure returned to normal. Six months later the pain in the breast returned and a lump was found. X-ray films showed another abscessed root and this tooth was extracted. The pain disappeared as before and the lump in the breast as well. She is apparently in excellent health now. In reporting this case, the writer well realizes the danger in doing so because there should usually be no delay in the surgical removal of all lumps in the breast.—M. W. T.

Focal Infection and Compensation Insurance

Without doubt, focal infection is costing insurance companies thousands of dollars every year. man who has a lower back injury, or sprains an ankle, knee or other joint, may, through focal infection in a tooth or some other part, prolong the original injury for several weeks or months. Perhaps there was no evidence that focal infection was doing any damage until there was an injury; microorganisms circulating through the bloodstream, may apparently cause no trouble until there is an injury. As a result a lower back strain which should be entirely well in two or three weeks is prolonged for months through this infection. Insurance companies suffer in such cases as well as the patient; it is costly to both. In all such injuries the physician should search for foci of infection, especially diseased teeth, and advise removal of these teeth as soon as possible. It is surprising how simple an injury will cause trouble in the presence of focal infection; it is equally surprising how quickly the injury will clear up when the abscessed tooth is extracted. Even when there has been a foreign body removed from the eye, sometimes a diseased tooth will be the cause of a resulting inflammation which requires several days to clear up.

—M. W. T.

Medical Blindness

Howard Clarke, M. D.
Honolulu, Hawaii

The recent surgical conference held in Honolulu was productive of some excellent papers and the conference is generally considered by doctors, press and the public as having been of great benefit to the community.

The essential product of this gathering which stands out with glaring emphasis is the vast amount of professional advertising, and the change which has occurred with the lapse of years in the profession's attitude toward individual advertising.

When a young man takes up the study of medicine he begins by learning the various parts of the body and how they function, and later what illnesses or malformations affect it, with the remedies to effect a cure. He finds that the training for a medical career is hard and slow and, along with the preparation for earning a living by the practice of medicine, there is acquired a conception of conduct and responsibility toward mankind that is due to the counsels and ideals that have been passed down from generation to generation by the great masters of medicine.

Hippocrates, the first physician and teacher, made his disciples take a solemn oath to obey rules of conduct that are practiced to this day by our profession.

Now there is another code drawn up and revised from time to time by the medical profession, known as medical ethics. These ethics are nothing but rules of good conduct and are intended primarily for the protection of the public.

It may seem to some that this code of the Doctors of Medicine is unnecessary, that the public is or ought to be able to take care of itself. This *was* the idea for many years with the business world but now it has Rotary, Kiwanis, Lions and other organizations, all of them preaching service and good conduct in an honest effort to make business as respectable as medicine.

In earlier times the aristocracy, the military, the learned professions, all looked down upon business—"Trades people." When we come to think over why this was so the reason is apparent. The nobility, the doctors, the lawyers and the military all had ideals, rules of conduct which were rigidly adhered to and the merchant class was regarded as parasites who had no ideals beyond getting as much as they could out of the world. It was said of the Dutch, who were noted as a nation of traders, "The trouble with the Dutch is, they give too little for which they ask too much."

Is this not true also of some eminent doctors' fees for consultation? Is medicine going to discard the high ideals of the past for a dubious business success? Are modern medical practitioners becoming blinded, afflicted by an optic atrophy from the glitter of silver and gold?

The cure is obvious, making money is not all there

is to a doctor's life. If this is to be the goal, why choose medicine for a career when the possibilities for making money are so much better in other occupations? What else is there in medicine to make it a career worth while?

Naturally a livelihood is essential and possible, though hardly a fortune, but there are other things as well.

There is no possibility of mastering the subject and so becoming bored, for the intellect is kept alert always, since no man yet has solved all the mysteries of disease or even all the functions of the body. The skilful use of the hands is a joy we share with artists and is unknown to the merchant in his occupation, which enables him to earn greater money rewards with accompanying prestige but, to get pleasure out of it he must give freely to hospitals, colleges, libraries and charities. This brings up the greatest essential for a satisfactory occupation, altruism.

Altruism is doing good to others without thought of reward. The doctor gives as he earns and none can surpass the limits of his possibilities in the field of charity.

Stevenson said, "It is not the accomplishment which is worth while but the glorious pursuit of it." The medical man should be ever pursuing more knowledge, practicing to acquire greater skill and ever seeking to be more useful to mankind.

To be useful to the greatest degree we must let the world know what we can do. Business men have long realized that a product to be sold with success required more than just excellence. The statement that "If a man made a better mouse trap than any one else the world would beat a pathway to his door" is challenged as to its veracity. Ample signs or advertisements must point the way to that door.

The Shriners have not been content merely to supply competent surgeons and adequate hospital facilities to carry on their great work of child rehabilitation—they have advertised most generously. The great charity clinics and welfare organizations have not been behind in crying out loud what they could and would do for humanity.

The medical profession has been reluctant to admit that similar methods were advisable for it to pursue.

We have learned much from irregular practitioners throughout the whole history of medicine despite our opposition and disapproval of their practices. There isn't any question about the benefit Homeopathy was to us in showing that the prodigious doses of drugs formerly customary were not so beneficial as believed.

Christian Science emphasized and made apparent that many illnesses were not physical but were of the mind and amenable to mental suggestion therapeutics.

Are we now to learn a lesson from another cult, Chiropractic, which has nothing to offer save advertising?

I am not trying to suggest a criticism of the new era in medical publicity that will indicate a complacency with the era that is past. I am not a venerable gray beard objecting to the new methods of publicity because they are different from the old, which believed that "When a man was able to do his work a little better than his neighbor, the world would be ready to take notice of him and his proper reward would follow."

My objection is rather because the new methods are not broad enough. They should include the whole profession of medicine and not feature individual showmen, played up to the public as wizards of the laboratory or performers of rare operations unknown or impossible to their colleagues.

The public report of a marvelous new cure for sea sickness by a member of the best advertised clinic in America, based upon its administration to a single patient, is to the old practitioner more conducive to an acute attack of *mal de mer* than anything I can think of.

Most of our difficulty has arisen from two falsehoods that are current and believed by both the new and the old generation of doctors: First there is the belief that there was a golden age of professional respectability and unity and Second, that there was something especially fine about this solid and conventional professional life. Both of these ideas are wrong. The past knows of no age where professional attainments were higher than at present. Older generations were professionally of small assistance to their patients compared with the medical men of the present but were strong believers in upholding the respectability of the title of Doctor. The modern doctor wants the world to respect the profession for what it can do and does do, but, how are we going to let the public know unless we advertise?

It has been done by medical men throughout the ages but the old dignified methods are no longer effective. The high hatted, long coated, bearded physician with the gold headed cane has passed. Nowadays, the press is worked for free and blatant advertisements by certain diligent members of our profession, to the dismay of some and disgust of others, until the time seems ripe to ask, if you do not like it, what are you going to do about it?

Editors, business men, the public at large, all see how extensively certain individuals of the medical profession advertise and welcome it, while they wonder how long it will be before the medical profession as a whole will openly and honestly advertise.

Medical blindness is our ostrich-like insistence on refusing to see what is going on around us. For its cure we should recognize that what is fair and correct for one in newspaper and other forms of advertising is fair and correct for all.

If we are not in accord with this policy of popularizing medical matter for the masses and, if despite its drawing power to bring patients and fees to our offices, we feel the supplying of medical pap to the people is beneath the dignity of a great profession and degrading to the individual physician, then we should rededicate ourselves to the noble of principles of right, justice and ethics laid down by our illustrious predecessors!

Suite 6, Young Building.

The Physician's Library

La Therapie Mechanique. By Dr. Gabriel Bidou, Paris. Preface by Professor d'Arsonval. Librarie Vuibert, Paris, 1930.

Dr. Bidou's work is unique and it should be translated into English. To those who are acquainted with Dr. Bidou's technic in recuperating paralytics, this volume will be welcome as it gives in detail how the work is accomplished, the photographs are excellent and the theory of mechanical therapy is discussed in the most thorough way. Mechanical therapy as we see it here is not the same as Bidou's. He studies the paralytic, finds the muscles at fault and replaces them mechanically by means of springs and other apparatus. One who visits his hospital, at Neuilly s/Seine, will be astounded at the way paralytics are able to move about. In this volume, the author describes his methods of correction of deformities without operation. His apparatus of movement called "arthromoteur" is described and illustrated. Bidou's table for physiologic research is shown, together with its utilisation. This book is a revelation of what the human brain can devise. A few years

ago Dr. Babinski told the reviewer that Bidou was the most ingenious man in the world in his line of work; even in this short space of time Bidou has advanced a great deal in his work and is creating something new constantly. He has worked for over thirty years on functional recuperation and a part of that time was closely associated with Babinski. Now he combines his own theories with that excellent training in physical examinations which no one could give like Babinski. To repeat, this volume should be translated.—M. W. T.

Treatment in General Practice. By Harry Beckman, M. D. W. B. Saunders Co., 1930. Pp. 899. Price, $10.00.

A painstaking treatise on therapeutics, well presented, thorough, and well indexed for quick reference. A good bibliography. 264 pages devoted to infectious diseases and well written. Covers the field very well and no great space given to controversies. About 100 pages devoted to diseases of the skin; 117 to "acute poisoning"; one chapter on burns and 136 pages devoted to obstetrics. In the miscellaneous section he considers chronic specific arthritis, essential dysmenorrhea, delirium tremens, seasickness, colloidal lead treatment of cancer, intracardiac injection of adrenalin. The book covers minor conditions as well as the more complicated. Recommended very highly.—M. W. T.

Sleep and the Treatment of its Disorders. By R. D. Gillespie, M. D. Wm. Wood and Co., N. Y. 1930. Pp. 267. Price, $3.25.

A practical treatise on this subject, taking up the physiology and pathophysiology of sleep, the effects of sleeplessness, pathology of sleep, treatment and theories of the nature of sleep. This problem always confronts the practitioner and this is one of the very few of its kind in print in recent years. It should have a place in practitioners' libraries.—M. W. T.

Tonsil Surgery. Based on a Study of the Anatomy. By Robert H. Fowler, M. D. F. A. Davis Co., Philadelphia. 1930. Pp. 288. Price, $10.00. 103 illustrations, including 10 full-page color plates. Published under the auspices of the Tonsil Hospital Research department.

A work of art in medical publishing. Beautifully illustrated with color plates and fine line half-tones and printed in a most artistic manner on excellent stock. Dr. Carrel writes a foreword. Dr. Fowler presents a thorough work on the anatomy of the tonsil. He gives other men's technic and then his own. Dr. Wingate Todd and Dr. Fowler discovered the tonsillopharyngeus muscle and its relations with the capsule, and as a result there is a marked improvement in tonsil technic. Formerly a fragment of this muscle was left in the throat which easily led to an infected surface. Dr. Fowler's new operation removes the whole tonsil without trauma to the other tissues and leaves the fossa covered with an intact fascia. In chapter 5, the author considers the question "Why and When the Tonsil Should Come Out" and every practitioner should read this. The book is valuable to the general practitioner because it teaches him when to advise the operation besides the kind of operation he thinks his patients should have. Complications, anesthesia, hemorrhage, the tonsil after surgical removal, hospital care, and follow up reports are all covered and there is a review with conclusions. All in all it is an outstanding book and besides appealing to specialists it should be in the hands of general practitioners in the hope that it might improve tonsil technic to the extent of preventing so many two-stage tonsillectomies—the second stage being the clean-up.—M. W. T.

Medical Insurance Examination. Modern Methods and Rating of Lives. By J. Paterson MacLaren. Second Edition. Wm. Wood and Co., N. Y. 1930. Pp. 646.

An exhaustive study of this subject from every angle. It deals with all problems of life insurance examination and a great deal of space is devoted to the most knotty problems met in this work. Ratings are fully considered. Well written. M. W. T.

Getting Well and Staying Well. A Book for Tuberculous Patients, Public Health Nurses and Doctors. By John Potts, M. D. C. V. Mosby Co., St. Louis, 1930. Pp. 221. Price $2.00.

Very interesting to patients, doctors and nurses. The chapter on Suspecting Tuberculosis is a masterpiece. Physicians will find many things of value in this volume.

Gynecology for Nurses and Gynecological Nursing. By Comyns Berkeley, M. A., M. D. G. P. Putnam's Sons, N. Y. 1930. Pp. 426. Price $2.75.

Subject thoroughly covered and principles of nursing care emphasized. Well illustrated. This is a textbook in the true sense of the word.

Disease and the Man. By George Draper, M. D. Pp. 270. The Macmillan Co., New York, 1930. Price $4.50.

A welcome sequel to *The Human Constitution* by Dr. Draper. The book is the result of the interesting work being conducted at the Constitution Clinic of the Presbyterian hospital in New York City. *The Human Constitition* was written in 1924 and this volume deals with the work at the clinic since that time. The total personality of Man is considered. Careful study has shown that the face in a nephritis hypertension case is thin with wide set eyes; tuberculosis usually shows a patient with a long thin face with narrow set eyes, in contrast to the wide, rounded gall-bladder countenance with relatively narrow eyes. In pernicious anemia the features are usually characterized by great interpupillary distance. In gastric ulcer patients the upper half of the face is wider and there is a small tapering chin. The nose is thin and prominent. The hands are gracile and fingers long and thin.

Thus, from hundreds of observations, patients are typed and the method forms the basis of new studies of patients. There are great possibilities in this work. Dr. Draper is constantly increasing his data.

The chapter on Genetics shows a great deal of painstaking family history work. Considerable space has been given to anthroposcopic findings. The chapter on The Psychological Panel is extremely interesting.

Every physician should read this book. He will become absorbed in it.—M. W. T.

Roentgenographic Technique. A manual for physicians, students, and technicians. By D. A. Rhinehart, A. M., M. D. With 159 illustrations. Pp. 388. Lea and Febiger, Philadelphia, 1930. Price $5.50.

A thorough consideration of roentgen technic, well presented and illustrated. Physics is considered, also dark-room equipment and technique, basic technique, practical exposure technique, practical exposure technique, and practical instructions regarding the actual work in the X-ray room. There are special chapters on X-rays of the upper and lower extremities, head, teeth, thoracic viscera, gastrointestinal and genitourinary tracts. Miscellaneous examinations cover the localization of foreign bodies, examinations during pregnancy and the examination of discharging sinuses. Photographs well illustrate the positions of the patient during examination. This book cannot be recommended too highly.

The Master of Destiny. A Biography of the Brain. By Frederick Tilney, M. D. Pp. 343, New York. Doubleday, Doran and Co., Inc.

This is a popular version of the author's formidable volumes on "The Brain From Ape to Man." Its central thesis is that the human brain has not yet completed its development. Man is still a child, which accounts for his strange behavior. Dr. Tilney argues for an awareness of the evolutionary process; we must be conscious of our destiny, in fact, masters of it. Man must construct his final empire of world cooperation wherein to know and to control himself. "Should this be deemed worthwhile, it must be paid for by the intelligent, unremitting toil necessary to develop the full capacity of our chief reliance—the human brain." Dr. Tilney traces the evolution of the brain through all its known phases and shows very convincingly the reasonableness of the concept that further evolution is inevitable; that we should direct it follows logically. It has taken a million years to bring us to our present "intermediate" phase; probably we shall now go forward more rapidly, to a point, for example, where we shall be able to adjudicate international affairs without butchering each other. The doctor hints that there will have to be some courageous weeding out of certain embarrassing fractions of humanity and some intensive selection. "Adequate appreciation of the processes underlying natural selection is certain to impart new and practical significance to the survival of the fittest." It seems to us that Dr. Tilney has put society under great obligation to him, for his clear thinking, based upon soundly buttressed scientific premises, ought to suggest new motives and methods to our educators, who are sadly in need of a new orientation.

Symptoms of Visceral Disease. A study of the Vegetative Nervous System in Its Relationship to Clinical Medicine. By Francis M. Pottenger, A. M., M. D., Fourth Edition. With 87 text illustrationsand 10 color plates. C. V. Mosby Co., St. Louis. 1930. Pp. 426. Price, $7.50.

Newer physiologic principles in the study of visceral neurology as applied to clinical medicine. Dr. Pottenger emphasizes that a great deal depends upon the constitutional background of the patient. The influence of emotions upon the nerves and endocrines is stressed. Many new revisions appear in this volume. An exhaustive study of the vegetative nervous system.